TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1937

No. 608

LINCOLN ENGINEERING COMPANY OF ILLINOIS,
PETITIONER,

vs.

STEWART-WARNER CORPORATION

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SEVENTH CIRCUIT

PETITION FOR CERTIORARI FILED NOVEMBER 25, 1937.

CERTIORARI GRANTED JANUARY 3, 1938.

IN THE

Supreme Court of the United States

OCTOBER TERM, A. D. 1937.

No. _____

LINCOLN ENGINEERING COMPANY OF ILLINOIS,
Petitioner,

vs.

STEWART-WARNER CORPORATION,
Respondent.

ON PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SEVENTH CIRCUIT.

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IN THE

United States Circuit Court of Appeals
For the Seventh Circuit

No. 6103

LINCOLN ENGINEERING COMPANY OF ILLINOIS,
Appellant,

vs.

STEWART-WARNER CORPORATION,
Appellee.

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1 Pleas in the District Court of the United States for the Northern District of Illinois, Eastern Division, begun and held at the United States Court Room, in the City of Chicago, in said District and Division, before the Honorable Walter C. Lindley, District Judge of the United States for the Northern District of Illinois, on Twenty-eighth day of August, in the year of our Lord one thousand nine hundred and Thirty-six, being one of the days of the regular July Term of said Court, begun Monday, the Sixth day of July, and of our Independence the 161st year. Placita.

Present:

Honorable Walter C. Lindley.
William H. McDonnell, U. S. Marshal.
Henry W. Freeman, Clerk.

2 IN THE DISTRICT COURT OF THE UNITED STATES,

Northern District of Illinois,

Eastern Division.

Stewart-Warner Corporation, *Plaintiff,*
vs.
Lincoln Engineering Co. of Illinois, *Defendant.*
} No. 13955.

Be It Remembered, that the above-entitled action was commenced by the filing of the following Bill of Complaint in the above-entitled cause in the office of the Clerk of the District Court of the United States for the Northern District of Illinois, Eastern Division, on this the 27th day of June, 1934.

Filed June 27, 1934.

3 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

BILL OF COMPLAINT.

Plaintiff, for complainant against defendants, alleges as follows:

(1) Plaintiff, Stewart-Warner Corporation, is a corporation organized and existing under and by virtue of the laws of the State of Virginia, a citizen of Virginia, a resident of and having its principal place of business in Chicago, in the County of Cook, and State of Illinois. Plaintiff is successor to the business of manufacturing and selling lubricating equipment and lubricants, of Alemite Corporation, formerly known as Alemite Manufacturing Corporation and The Bassick Manufacturing Company.

(2) Defendants, John R. LeVally and Frederick A. Faville, are citizens of the United States and of the State of Illinois, and residents of the State of Illinois, doing business as Lincoln Engineering Company of Illinois, located at 4521 South Cottage Grove Avenue, in the City of Chicago, and State of Illinois, within the Northern District of Illinois,

4 Eastern Division, in which district and division the defendants have committed acts of infringement of plaintiff's patents of which complaint is made herein.

(3) This court has jurisdiction by reason of the fact that

this is a suit in equity, arising under the patent laws of the United States, and plaintiff has no adequate remedy at law.

(4) Plaintiff alleges, upon information and belief, that Clyde G. Butler, a citizen of the United States, being prior to February 19, 1923, the original, first, and sole inventor of certain new and useful improvements in lubricating apparatus, lawfully filed and prosecuted an application for United States patent therefor, and having complied in all respects with the statutes and rules of the Patent Office, United States patent No. 1,593,791 was granted lawfully and issued pursuant to said application on July 27, 1926.

(5) Plaintiff alleges, upon information and belief, that Douglas F. Fesler, a citizen of the United States, being prior to March 17, 1920, the original, first, and sole inventor of certain new and useful improvements in lubricating systems, filed and prosecuted lawfully an application for United States patent therefor, and having complied in all respects with the statutes and rules of the Patent Office, United States patent No. 1,408,573 was granted lawfully and issued pursuant to said application on March 7, 1922.

(6) Plaintiff alleges, upon information and belief, that said inventions of Clyde G. Butler and Douglas F. Fesler were new, useful, not known or used by others in this country before their respective inventions, not patented or described in any printed publication anywhere before their respective inventions, or more than two years prior to their respective applications for said Letters Patent, not in public use or on sale in this country for more than two years prior to their said applications for Letters Patent, not patented in any foreign country by them or their legal representatives on applications filed more than one year before their said applications in this country, and not abandoned. Said patents are now in full force and are hereby proffered and ready to be produced before the court.

(7) Prior to the commencement of this suit, plaintiff Stewart-Warner Corporation became, by lawful assignments, and now is the sole owner of said United States patents Nos. 1,593,791 and 1,408,573 and of all rights thereunder and of all rights of action for infringment thereof. Proffert is hereby made of the original instruments upon which plaintiff Stewart-Warner Corporation's title is based.

(8) The inventions patented by said patents Nos. 1,593,791 and 1,408,573 are of great utility and are of great value to plaintiff, and of great benefit to the public. Plaintiff

Stewart-Warner Corporation and its predecessors have sold very extensively and introduced into public use, devices in which said patented inventions are embodied, and the public and manufacturers have demanded and purchased from plaintiff Stewart-Warner Corporation and its predecessors, such devices embodying said inventions in very large and in very rapidly increasing quantities.

(9) Plaintiff alleges, upon information and belief, that plaintiff Stewart-Warner Corporation and its predecessors have marked all devices embodying said inventions made or sold by them in full compliance with the United States statutes.

6 (10) The public has, in general, acknowledged the validity of the aforesaid patents Nos. 1,593,791 and 1,408,573 and has respected plaintiff's rights therein and thereunder.

(11) Heretofore, to-wit, on May 17, 1930, Alemite Corporation, predecessor of plaintiff, brought a suit against The Grease Rite Corporation, in the United States District Court at Chicago, Illinois. The said suit came on for final hearing upon Butler patent No. 1,593,791, Parrott patent No. 1,711,903, and Murphy patent No. 1,716,501, and the court, after hearing the evidence offered on behalf of both sides and upon briefs rendered an opinion and entered a decree sustaining said patents and finding that they were infringed. As appears in said decree, entered on or about February 15, 1933, claim 1 of said Butler patent No. 1,593,791 was held valid and infringed.

(12) Plaintiff alleges, upon information and belief, that defendants, in violation of plaintiff's rights under said patents Nos. 1,593,791 and 1,408,573, and without any authority since the issuance of said patents, and within six years before the commencement of this suit within the district aforesaid and elsewhere in the United States, has threatened to infringe and has infringed said patents Nos. 1,593,791 and 1,408,573, by making and/or using and/or selling lubricating apparatus embodying said patented inventions and by making and/or using and/or vending devices designed and intended for use in apparatus embodying said patented inventions. Defendants threaten to continue to commit acts in violation of plaintiff's rights and in infringement of said patents, whereby plaintiff has been and will be greatly and ir-

reparably damaged, and whereby defendants are about
7 to obtain large profits which in equity will belong to plaintiff, the amount of which damages and profits plaintiff cannot ascertain except by an accounting.

Plaintiff, Therefore, Prays:

(a) That the defendants be required to answer this bill of complaint, but not under oath, answer under oath being hereby expressly waived.

(b) That the court grant a preliminary injunction pending this suit, and a permanent injunction against the defendants, their agents, employees, associates and confederates, enjoining and restraining them from making and/or using and/or vending the combinations patented in said patents, or any of the parts thereof, or any other device or devices embodying, or adapted or intended for use in apparatus embodying the inventions claimed in said patents, either for original equipment or for replacement under the guise of "repairs" or otherwise, and from offering or advertising so to do, and from aiding or abetting or in any other way contributing to the infringement of said patents.

(c) That this cause be referred to a Master to take and report an account of damages and profits accruing from defendants' infringement of said patents, and that plaintiff have judgment for the damages and profits so found and for the costs of this suit.

8 (d) That plaintiff have such other and further relief as equity may require.

Stewart-Warner Corporation,
By J. E. Otis, Jr.

Lynn A. Williams,
Benjamin F. Wupper,
Williams, Bradbury, McCalib & Hinkle,
Solicitors and Counsel for Plaintiff.

State of Illinois }
County of Cook } ss.

J. E. Otis, Jr., being first duly sworn on oath, deposes and says that he is President of Stewart-Warner Corporation, the plaintiff named in the foregoing bill of complaint; that he has read the said bill of complaint and knows the contents thereof, and that the same is true of his own knowledge except

as to the matters therein stated to be alleged on information and belief, and as to those matters he believes them to be true.

J. E. Otis, Jr.

Subscribed and Sworn to before me this 26th day of June, 1934.

Irene Salmoas,
Notary Public.

(Seal)

9-14 (Plaintiff's Exhibit 4, U. S. Patent 1,593,791. See index.)

Entered Aug. 1, 1934.

15 And afterwards, to wit, on the 1st day of August, 1934, being one of the days of the regular July term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable Philip L. Sullivan, District Judge appears the following entry, to wit:

16 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—13955) * *

August 1, 1934.

Present: Honorable Philip L. Sullivan, Judge of said Court.

On stipulation of the parties to this suit filed herein

It Is Ordered that the defendants have until August 15, 1934 to file their answer or other response to the Bill of Complaint filed in this cause.

Filed July 31, 1934.

17 And on, to wit, the 31st day of July, 1934, came the Defendants by their attorneys and filed in the Clerk's office of said Court a certain Motion for a Bill of Particulars in words and figures following, to wit:

18 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

DEFENDANTS' MOTION FOR BILL OF PARTICULARS.

Now come defendants, and move that plaintiff be required to furnish a bill of particulars as follows:

Item 1. The apparatus upon which plaintiff will rely at the trial.

Item 2. The patent claims upon which plaintiff will rely at the trial, as to the respective apparatus specified in Item 1.

Delos G. Haynes,
Counsel for Defendants.

July 30, 1934.

State of Missouri, } ss.
City of St. Louis. }

Dorothy Merriam, being duly sworn, deposes and says that on this thirtieth day of July, 1934, she sent by registered mail to Messrs. Williams, Bradbury, McCaleb and Hinkle, Chicago, Illinois, a copy of the above motion.

Dorothy Merriam.

Sworn to and subscribed before me this thirtieth day of July 1934.

My commission expires: March 20th, 1935.

Olga Becker,
Notary Public.

(Notarial Seal)

19 And on, to wit, the 14th day of August, 1934, came the Defendants by their attorneys and filed in the Clerk's office of said Court a certain Answer in words and figures following, to wit: Filed Aug. 14, 1934.

20 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

ANSWER.

Come now defendants and make answer to the bill of complaint as follows:

1. Defendants are without knowledge as to the allegations in paragraph 1 of the bill of complaint, and leave plaintiff to its proofs.

2. Defendants admit that they are citizens of the United States and of the State of Illinois, and residents of the State of Illinois, and that they are doing business as Lincoln Engineering Company of Illinois, and are located at 4521 South Cottage Grove Avenue, in the City of Chicago and State of Illinois, within the Northern District of Illinois, Eastern

Division, but defendants deny that they have committed any acts of infringement of plaintiff's patents of which complaint is made in the bill of complaint.

3. Defendants admit that this is a suit in equity arising under the patent laws of the United States, but deny that plaintiff is entitled to any remedy, and deny that plaintiff has no adequate remedy at law.

21 4. Defendants deny that Clyde G. Butler was the original, first, and/or sole inventor of certain new and useful improvements in lubricating apparatus; and that he lawfully filed and/or prosecuted an application for United States patent therefor; defendants admit that the United States Patent No. 1,593,791 was granted on July 27, 1926, but deny that the statutes and rules of the Patent Office were duly complied with.

5. Defendants deny that Douglas F. Fesler was the original, first, and/or sole inventor of certain new and useful improvements in lubricating systems; defendants admit that an application for United States patent therefor was filed and prosecuted, but deny that said filing and/or prosecution was lawful; defendants admit that United States patent No. 1,408,573 was granted on March 7, 1922, but deny that the statutes and/or rules of the Patent Office were complied with.

6. Defendants deny that the alleged inventions of said Clyde G. Butler and/or Douglas F. Fesler were new and/or useful, and/or not known or used by others in this country before their alleged inventions, and/or not patented or described in any printed publication anywhere before their alleged inventions, or more than two years prior to their respective applications for said Letters Patent; and/or not in public use and/or on sale in this country for more than two years prior to their said applications for Letters Patent, and/or not patented in any foreign country by them or their legal representatives on applications filed more than one year before their said applications in this country, and/or not abandoned. Defendants deny that said patents are now in full force.

22 7. Defendants are without knowledge of the allegations in paragraph 7 of the bill of complaint, and leave plaintiff to its proofs.

8. Defendants deny the allegations in paragraph 8 of the bill of complaint.

9. Defendants deny that plaintiff Stewart-Warner Corporation and/or its predecessors have marked all devices embodying said alleged inventions made or sold by them in full compliance with the United States statutes.

10. Defendants deny the allegations in paragraph 10 of the bill of complaint.

11. Defendants are without knowledge as to the allegations in paragraph 11 of the bill of complaint, and leave plaintiff to its proofs.

12. Defendants deny the allegations in paragraph 12 of the bill of complaint.

13. Defendants aver:

First: That for the purpose of deceiving the public the descriptions and specifications filed by the patentees Clyde G. Butler and Douglas F. Fesler in the Patent Office were made to contain less than the whole truth relative to their invention or discovery alleged to be disclosed in said patents 1,593,791 and 1,408,573 respectively, or more than is necessary to produce the desired effect.

Second: That the said Clyde G. Butler and Douglas F. Fesler had surreptitiously or unjustly obtained the said patents 1,593,791 and 1,408,573 respectively, for that which was in fact invented by another, who was using reasonable diligence in adapting and perfecting the same.

23 Third: That the alleged inventions of said patents 1,593,791 and 1,408,573 had been patented or described in a printed publication prior to Butler's and Fesler's respective supposed invention or discovery thereof, or more than two years prior to their respective applications for patents therefor.

Fourth: That the said Clyde G. Butler and Douglas F. Fesler were not respectively the original and first inventors or discoverers of any material and substantial part of the thing patented, or alleged to be patented, in said patents 1,593,791 and 1,408,573 respectively.

Fifth: That the alleged inventions of said patents 1,593,791 and 1,408,573 had been in public use or on sale in this country for more than two years before the respective applications for said patents, or had been abandoned to the public.

Sixth: As to sections first, second, third, fourth and fifth of this paragraph thirteen, names of the patentees and the dates of their patents, and when granted, and the names and residences of the persons alleged to have invented or to have

had the prior knowledge of the things patented, and where and by whom said things had been used are at present unknown in sufficient detail to defendants, but which when ascertained, defendants pray leave to insert in this answer by amendment thereto.

14. Defendants aver that the things patented in said patents were not novel or useful within the meaning of the patent statutes but, in view of the art then existing, involved merely the skill of one skilled in the art.

24 15. Defendants deny that they have damaged or injured plaintiff in any manner or form whatsoever, and deny the plaintiff is entitled to have or recover any profits or damages or the costs of this action, and deny that plaintiff is entitled to any relief whatsoever from defendants.

16. Wherefore, defendants pray (a) that each and every prayer of said bill of complaint be denied; (b) that said bill be dismissed; (c) that defendants' costs and disbursements be taxed against plaintiff; (d) that defendants have judgment for said costs and disbursements, and that execution issue therefore; and (e) that defendants have such other and further relief as may be appropriate under the circumstances.

John R. LeVally and Frederick A. Faville, doing business as Lincoln Engineering Company of Illinois.
By Delos G. Haynes,
L. R. Koenig,
Counsel,
618 Olive St.,
St. Louis, Missouri.

Wilkinson, Huxley, Byron, Knight,
Attorneys,
38 South Dearborn Street,
Chicago, Illinois.

Service of the above answer and receipt of a copy thereof is hereby admitted this 14th day of August, 1934.

Williams, Bradbury, McCaleb & Hinkle,
Attorneys for Plaintiff.

25 And on, to wit, the 20th day of August, 1934, came the Plaintiff by its attorneys and filed in the Clerk's office of said Court a certain Bill of Particulars in words and figures following, to wit:

26 (Caption) Filed Aug. 20, 1934.

PLAINTIFF'S BILL OF PARTICULARS.

Now comes plaintiff, by its solicitors, and states:

1. Plaintiff charges that the sale by defendants of "Model ND5", Lincoln Engineering Co. "Lubrigun Nozzle", constituted an infringement of plaintiff's patents, as alleged in plaintiff's bill of complaint.

2. Plaintiff charges that defendants infringe the following claims of the Letters Patent of United States alleged to be infringed in plaintiff's bill of complaint, namely, claim 1 of Butler patent No. 1,593,791, and claims 3, 5, 7, 8, 9, 11 and 12 of Fesler patent No. 1,408,573.

Williams, Bradbury, McCaleb & Hinckle,
Solicitors and Counsel for Plaintiff.

Chicago, Illinois.
August 18, 1934.

27 And afterwards, to wit, on the 10th day of May, 1935, being one of the days of the regular May term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable Patrick T. Stone, District Judge appears the following entry, to wit: Entered May 10, 1935.

28 UNITED STATES DISTRICT COURT.

• • (Caption—13955) • •

ORDER GRANTING LEAVE TO FILE SUPPLEMENTAL BILL OF COMPLAINT.

This cause having come on to be heard at this term of court, upon the motion of plaintiff for leave to file a supplemental bill of complaint, and counsel having been heard, it is hereby

Ordered, Adjudged and Decreed:

That plaintiff be and hereby is granted leave to file said supplemental bill of complaint, and to join the Lincoln Engineering Co. of Illinois as party defendant herein; and that a subpoena directed to said corporation be issued herein, re-

quiring it to answer said supplemental bill of complaint within twenty (20) days after service of said subpoena.

Patrick T. Stone,
United States District Judge.

May 10, 1935.
No objections
Wilkinson, Huxley, Byron & Knight,
William T. Miller.

Filed May 10, 1935.

29 And on, to wit, the 10th day of May, 1935, came the Plaintiff by its attorneys and filed in the Clerk's office of said Court a certain Supplemental Bill of Complaint in words and figures following, to wit:

30 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

SUPPLEMENTAL BILL OF COMPLAINT.

Plaintiff, Stewart-Warner Corporation, by leave of court first had and obtained, files this supplemental bill of complaint in this cause and says:

(1) Since the filing of the original bill of complaint herein on June 27, 1934, plaintiff avers that the following material facts have occurred, to-wit:

(2) Defendants, John R. LeVally and Frederick A. Faville, as subscribers to the capital shares of the Lincoln Engineering Co. of Illinois, and as incorporators thereof, have procured Articles of Incorporation for the Lincoln Engineering Co. of Illinois, which company was chartered by the State of Illinois on the 9th day of November, 1934, and is now a corporation organized and existing under and by virtue of the laws of the State of Illinois, resident within the Northern District of Illinois and the jurisdiction of this court.

(3) Lincoln Engineering Co. of Illinois, a corporation, together with defendants John R. LeVally and Frederick A. Faville, in violation of plaintiff's rights under United

31 States Letters Patent Nos. 1,408,573 and 1,593,791, and without any authority since the issuance of said patents and within six (6) years before the commencement of this suit within the jurisdiction of this court and elsewhere in the United States, have infringed said United States Let-

ters Patent by making and/or using and/or selling lubricating apparatus embodying said patented inventions and by making and/or using and/or vending devices designed and intended for use in apparatus embodying said patented inventions. Defendants threaten to continue to commit acts in violation of plaintiff's rights and in infringement of said patents, whereby plaintiff has been and will be greatly and irreparably damaged, and whereby defendants are about to obtain large profits which in equity will belong to plaintiff, the amount of which damages and profits plaintiff cannot ascertain except by an accounting.

Plaintiff therefore prays, in addition to the relief heretofore prayed for:

(1) That defendant Lincoln Engineering Co. of Illinois be required to answer this supplemental bill of complaint within twenty (20) days after service of process herein, answer under oath being hereby expressly waived.

(2) That the court grant a preliminary injunction pending this suit, and a permanent injunction against the defendants; their agents, employees, associates and confederates, enjoining and restraining them for making and/or using and/or vending the combinations patented in said patents, or any of the parts thereof, or any other device or devices embodying, or adapted or intended to be used in apparatus embodying the invention claimed in said patents, and from offering or advertising so to do, and from aiding or abetting or in any way contributing to the infringement of said patents.

32 (3) That this cause be referred to a Master to take and make an account of damages and profits accruing from defendants' infringement of said patents, and that plaintiff have judgment for the damages and profits so found and for the costs of this suit.

(4) That plaintiff have such other and further relief as equity may require.

Stewart-Warner Corporation,
By Williams, Bradbury, McCaleb & Hinkle,
Lynn A. Williams,
Solicitors and Counsel for Plaintiff.

May 10, 1935.

Filed Apr. 21, 1936.

33 And on, to wit, the 21st day of April, 1936 came the Defendant by its attorneys and filed in the Clerk's office of said Court a certain Motion for Bill of Particulars in words and figures following, to wit:

34 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

MOTION OF DEFENDANT, LINCOLN ENGINEERING CO. OF ILLINOIS, FOR BILL OF PARTICULARS.

Now comes defendant, Lincoln Engineering Co. of Illinois, and moves that plaintiff be required to furnish a bill of particulars as follows:

Item 1. The apparatus upon which plaintiff will rely at the trial, as to the supplemental bill of complaint.

Item 2. The patent claims upon which plaintiff will rely at the trial, as to the respective apparatus specified in Item 1.

Lincoln Engineering Co. of Illinois,
By Delos G. Haynes,
L. R. Koenig,
Counsel.

Filed May 28, 1935.

35 And on, to wit, the 28th day of May, 1935 came the Plaintiff by its attorneys and filed in the Clerk's office of said Court a certain Amended Bill of Particulars in words and figures following, to wit:

36 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

PLAINTIFF'S AMENDED BILL OF PARTICULARS.

Now comes plaintiff, by its solicitors, and states:

(1) Plaintiff charges that the sale by defendants of "Model ND5" Lincoln Engineering Co. "Lubrigun Nozzle," and the sale of "Lincoln Kleenseal" lubricant receiving fittings exemplified by fittings "No. 5000" and "No. 5300" constitute infringements of plaintiff's patents, as alleged in plaintiff's bill of complaint.

(2) Plaintiff charges that defendants infringe the following claims of the Letters Patent of the United States alleged

to be infringed in plaintiff's bill of complaint, namely, claims 1 and 2 of Butler patent No. 1,593,791, and claims 3, 5, 7, 8, 9, 11, and 12 of Fesler patent No. 1,408,573.

Lynn A. Williams,
Williams, Bradbury, McCaleb & Hinkle,
Solicitors and Counsel for Plaintiff.

Chicago, Illinois.
May 28, 1935.

37 And on, to wit, the 29th day of May, 1935 came the Plaintiff by its attorneys and filed in the Clerk's office of said Court certain Interrogatories in words and figures following, to wit: Filed May 29, 1935.

38 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

INTERROGATORIES OF PLAINTIFF.

Now comes the plaintiff, and with leave of court files the following interrogatories to be answered by the defendants specified in the note at the foot hereof:

(1) Did the defendant John R. LeVally, within six years prior to the filing of the bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Model ND5" Lincoln Engineering Co. "Lubrigun Nozzle," which may be inspected at the office of the plaintiff's solicitors?

(2) Did the defendant John R. LeVally, within six years prior to the filing of the bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Lincoln Kleenseal" lubricant receiving fittings "No. 5000" and "No. 5300," which may be inspected at the office of plaintiff's solicitors?

(3) Did the defendant Frederick A. Faville, within six years prior to the filing of the bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Model ND5" Lincoln Engineering Co. "Lubrigun Nozzle," which may be inspected at the office of the plaintiff's solicitors?

39 (4) Did the defendant Frederick A. Faville, within six years prior to the filing of the bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Lincoln Kleenseal" lubricant receiving fittings "No.

5000" and "No. 5300," which may be inspected at the office of plaintiff's solicitors?

(5) Did the defendant Lincoln Engineering Co. of Illinois, within six years prior to the filing of the supplemental bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Model ND5" Lincoln Engineering Co. "Lubrigun Nozzle," which may be inspected at the office of plaintiff's solicitors?

(6) Did the defendant Lincoln Engineering Co. of Illinois, within six years prior to the filing of the supplemental bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Lincoln Kleenseal" lubricant receiving fittings "No. 5000" and "No. 5300," which may be inspected at the office of plaintiff's solicitors?

Williams, Bradbury, McCaleb & Hinkle,
Solicitors and Counsel for Plaintiff.

Chicago, Illinois,
May 29, 1935.

Note: Defendant John R. LeVally will answer Interrogatories 1 and 2; Defendant Frederick A. Faville will answer Interrogatories 3 and 4; and any officer of Lincoln Engineering Co. of Illinois familiar with the facts will answer Interrogatories 5 and 6.

Filed June 3, 1935.

40 And on, to wit, the 3rd day of June, 1935 came the Defendants by their attorneys and filed in the Clerk's office of said Court a certain Answer to Supplemental Bill of Complaint in words and figures following, to wit:

41 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

ANSWER TO SUPPLEMENTAL BILL OF COMPLAINT.

Come now defendants Lincoln Engineering Co. of Illinois, and John R. LeVally and Frederick A. Faville, doing business as Lincoln Engineering Co. of Illinois, and make answer to the supplemental bill of complaint as follows:

1. Said defendants admit the allegations in paragraph (2) of the supplemental bill of complaint.

2. Said defendants deny that they together have, in violation of plaintiff's alleged rights under United States Letters Patent Nos. 1,408,573 and 1,593,791, and/or without au-

thority since the issuance of said patents and within six years before the commencement of this suit, or any time, within the jurisdiction of this court or anywhere else,
42 infringed said United States Letters Patent by making and/or using and/or selling lubricating apparatus embodying said alleged patented inventions, and/or by making and/or using and/or vending devices designed and/or intended for use in apparatus embodying said alleged patented inventions; and deny that plaintiff has any rights under said patents. Defendants deny that they threaten to continue to commit alleged acts in violation of plaintiff's alleged rights and in alleged infringement of said patents; defendants deny that plaintiff has been and/or will be greatly and irreparably damaged, or damaged to any extent whatsoever; defendants deny that they are about to obtain large or any profits; and deny that such alleged profits belong to plaintiff, in equity or otherwise; and defendants deny that an accounting is necessary.

3. Defendants aver:

First: That for the purpose of deceiving the public the respective descriptions and specifications filed by the patentees Clyde G. Butler and Douglas F. Fesler in the Patent Office were made to contain less than the whole truth relative to their respective inventions or discoveries alleged to be disclosed in said patents 1,593,791 and 1,408,573 respectively, or more than is necessary to produce the desired effects.

Second: That the said Clyde G. Butler and Douglas F. Fesler had surreptitiously or unjustly obtained the said patents 1,593,791 and 1,408,573 respectively, for that which was in fact invented by others, who were using reasonable diligence in adapting and perfecting the same.

43 Third: That the alleged inventions of said patents 1,593,791 and 1,408,573 had been patented or described in a printed publication prior to Butler's and Fesler's respective supposed invention or discovery thereof, or more than two years prior to their respective applications for patents therefor.

Fourth: That the said Clyde G. Butler and Douglas F. Fesler were not respectively the original and first inventors or discoverers of any material and substantial part of the thing patented, or alleged to be patented, in said patents 1,593,791 and 1,408,573 respectively.

Fifth: That the alleged inventions of said patents 1,593,791 and 1,408,573 had been in public use or on sale in this country

for more than two years before the respective applications for said patents, or had been abandoned to the public.

Sixth: As to sections First, Second, Third, Fourth and Fifth of this paragraph three, names of the patentees and the dates of their patents, and when granted, and the names and residences of the persons alleged to have invented or to have had the prior knowledge of the things patented, and where and by whom said things had been used are at present unknown in sufficient detail to defendants, but which when ascertained, defendants pray leave to insert in this answer by amendment thereto.

4. Defendants aver that the things patented in said patents were not novel or useful within the meaning of the patent statutes but, in view of the art then existing, involved merely the skill of one skilled in the art.

5. Defendants deny that they have damaged or injured plaintiff in any manner or form whatsoever, and deny the plaintiff is entitled to have or recover any profits or damages or the costs of this action, and deny that plaintiff is entitled to any relief whatsoever from defendants.

44 6. Wherefore, defendants pray (a) that prayers (2), (3) and (4) of the supplemental bill of complaint be denied; (b) that said supplemental bill be dismissed; (c) that defendants' costs and disbursements be taxed against plaintiff; (d) that defendants have judgment for said costs and disbursements, and that execution issue therefor; and (e) that defendants have such other and further relief as may be appropriate under the circumstances.

John R. Le Vally and Frederick A. Faville, doing business as Lincoln Engineering Co. of Illinois; and Lincoln Engineering Co. of Illinois, a corporation

By Delos G. Haynes,
Lloyd R. Koenig,
Counsel
818 Olive Street
St. Louis, Missouri.

Attorneys
38 South Dearborn Street
Chicago, Illinois.

Affidavit.

State of Missouri } ss.
City of St. Louis }

Elizabeth Wittwer, being duly sworn, deposes and says that on the thirty-first day of May, 1935, she sent by registered mail to Messrs. Williams, Bradbury, McCaleb and Hinkle, attorneys for plaintiff, 141 West Jackson Boulevard, Chicago, Illinois, a copy of the above Answer to Supplemental Bill of Complaint.

Elizabeth Wittwer.

Sworn to and subscribed before me this thirty-first day of May, 1935.

My commission expires: June 24, 1938.

T. Louise Kelley,
Notary Public.

(Notarial Seal)

45 And on, to wit, the 13th day of June, 1935, came the Defendants by their attorneys and filed in the Clerk's office of said Court certain Answers in words and figures following, to wit: Filed June 13, 1935.

46 UNITED STATES DISTRICT COURT.
* * (Caption—13955) * *

ANSWERS OF DEFENDANT JOHN R. LeVALLY TO PLAINTIFF'S INTERROGATORIES ONE AND TWO.

Now comes the above-named defendant, and answers plaintiff's interrogatories one and two as follows:

(1) Did the defendant John R. LeVally, within six years prior to the filing of the bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Model ND5" Lincoln Engineering Co. "Lubrigun Nozzle," which may be inspected at the office of plaintiff's solicitors?

Yes, or a duplicate thereof.

(2) Did the defendant John R. LeVally, within six years prior to the filing of the bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Lincoln Kleenseal" lubricant receiving fittings "No. 5000" and "No.

5300," which may be inspected at the office of plaintiff's solicitors?

No.

John R. LeVally.
(John R. LeVally)

Affidavit.

State of Illinois, } ss.
County of Cook, }

On this 11th day of June, 1935, before me personally appeared John R. LeVally, to me personally known, who being by me first duly sworn, deposed and said that he has read the above answers to Interrogatories One and Two; and that said answers are true, to the best of his knowledge and belief.

My commission expires: Dec. 7, 1938.

Verna Maloney,
(Notarial Seal) *Notary Public.*

47 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

ANSWERS OF DEFENDANT FREDERICK A. FAVILLE, TO PLAINTIFF'S INTERROGATORIES THREE AND FOUR.

Now comes the above-named defendant, and answers plaintiff's interrogatories three and four as follows:

(3) Did the defendant Frederick A. Faville, within six years prior to the filing of the bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Model ND5" Lincoln Engineering Co. "Lubrigun Nozzle," which may be inspected at the office of plaintiff's solicitors?

Yes, or a duplicate thereof.

(4) Did the defendant Frederick A. Faville, within six years prior to the filing of the bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Lincoln Kleenseal" lubricant receiving fittings "No. 5000" and "No. 5300," which may be inspected at the office of plaintiff's solicitors?

No.

Frederick A. Faville.
(Frederick A. Faville)

Affidavit.

State of Illinois, } ss.
County of Cook, }

On this 11th day of June, 1935, before me personally appeared Frederick A. Faville, to me personally known, who being by me first duly sworn, deposed and said that he has read the above answers to Interrogatories three and four; and that said answers are true, to the best of his knowledge and belief.

My commission expires: Dec. 7, 1938.

Verna Maloney,
Notary Public.

(Notarial Seal)

48 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

ANSWERS OF FREDERICK A. FAVILLE, PRESIDENT OF LINCOLN ENGINEERING CO. OF ILLINOIS TO PLAINTIFF'S INTERROGATORIES FIVE AND SIX.

Now comes Frederick A. Faville, president of the above-named defendant, and answers plaintiff's interrogatories five and six as follows:

(5) Did the defendant Lincoln Engineering Co. of Illinois, within six years prior to the filing of the supplemental bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Model ND5" Lincoln Engineering Co. "Lubrigun Nozzle," which may be inspected at the office of plaintiff's solicitors?

Yes, or a duplicate thereof.

(6) Did the defendant Lincoln Engineering Co. of Illinois, within six years prior to the filing of the supplemental bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the "Lincoln Kleenseal" lubricant receiving fittings "No. 5000" and "No. 5300," which may be inspected at the office of plaintiff's solicitors?

Yes, or a duplicate thereof.

Frederick A. Faville.
(Frederick A. Faville)

Affidavit.

State of Illinois, } ss.
County of Cook, }

On this 11th day of June, 1935, before me personally appeared Frederick A. Faville, to me personally known, who being by me first duly sworn, deposed and said that he is president of Lincoln Engineering Co. of Illinois, the above-named defendant; that he has read the above interrogatories five and six; and that said answers are true, to the best of his knowledge and belief.

My commission expires: Dec. 7, 1938.

Verna Maloney,
Notary Public.

(Notarial Seal)

Entered July 8, 1935.

49 And afterwards, to wit, on the 8th day of July, 1935, being one of the days of the regular July term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable James H. Wilkerson, District Judge appears the following entry, to wit:

50 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

ORDER GRANTING LEAVE TO FILE AMENDED BILL OF COMPLAINT.

This cause having come on to be heard upon motion of the plaintiff for leave to file an amended bill of complaint instanter,

It Is Ordered: That

Plaintiff have leave to file instanter the amended bill of complaint.

James H. Wilkerson,
United States District Judge.

July 8, 1935.

51 And on, to wit, the 8th day of July, 1935, came the Plaintiff by its attorneys and filed in the Clerk's office of said Court a certain Amended Bill of Complaint in words and figures following, to wit:

52 UNITED STATES DISTRICT COURT. Filed July 8, 1935.

* * (Caption—13955) * *

AMENDED BILL OF COMPLAINT.

Plaintiff, having filed its bill of complaint, and supplemental bill of complaint herein, leave of court having been obtained, now files this amended bill of complaint in lieu thereof, and for complaint against defendants, alleges as follows:

(1) Plaintiff, Stewart-Warner Corporation, is a corporation organized and existing under and by virtue of the laws of the State of Virginia, a citizen of Virginia, a resident of and having its principal place of business in Chicago, in the County of Cook, and State of Illinois. Plaintiff is successor to the business of manufacturing and selling lubricating equipment and lubricants, of Alemite Corporation, formerly known as Alemite Manufacturing Corporation and The Bassick Manufacturing Company.

(2) Defendants, John R. LeVally and Frederick A. Faville, are citizens of the United States and of the State of Illinois, and residents of the State of Illinois, doing business as
53 Lincoln Engineering Company of Illinois, located at 4521 South Cottage Grove Avenue, in the City of Chicago, and State of Illinois, within the Northern District of Illinois, Eastern Division, in which district and division the defendants have committed acts of infringement of plaintiff's patents of which complaint is made herein.

Defendants, John R. LeVally and Frederick A. Faville, as subscribers to the capital shares of the defendant Lincoln Engineering Co. of Illinois, and as incorporators thereof, have procured Articles of Incorporation for the defendant Lincoln Engineering Co. of Illinois, which company was chartered by the State of Illinois on the 9th day of November, 1934, and is now a corporation organized and existing under and by virtue of the laws of the State of Illinois, resident within the Northern District of Illinois and the jurisdiction of this court.

(3) This court has jurisdiction by reason of the fact that this is a suit in equity, arising under the patent laws of the United States, and plaintiff has no adequate remedy at law.

(4) Plaintiff alleges, upon information and belief, that Clyde G. Butler, a citizen of the United States, being prior to February 19, 1923, the original, first, and sole inventor of certain new and useful improvements in lubricating apparatus, lawfully filed and prosecuted an application for United

States patent therefor, and having complied in all respects with the statutes and rules of the Patent Office, United States patent No. 1,593,791 was granted lawfully and issued pursuant to said application on July 27, 1926.

(5) Plaintiff alleges, upon information and belief, that Douglas F. Fesler, a citizen of the United States, being prior to March 17, 1920, the original, first, and sole inventor of certain new and useful improvements in lubricating systems, filed and prosecuted lawfully an application for United States patent therefor, and having complied in all respects with the statutes and rules of the Patent Office, United States patent No. 1,408,573 was granted lawfully and issued pursuant to said application on March 7, 1922.

(6) Plaintiff alleges, upon information and belief, that said inventions of Clyde G. Butler and Douglas F. Fesler, were new, useful, not known or used by others in this country before their respective inventions, not patented or described in any printed publication anywhere before their respective inventions, or more than two years prior to their respective applications for said Letters Patent, not in public use or on sale in this country for more than two years prior to their said application for Letters Patent, not patented in any foreign country by them or their legal representatives on applications filed more than one year before their said applications in this country, and not abandoned. Said patents are now in full force and are hereby proffered and ready to be produced before the court.

(7) Prior to the commencement of this suit, plaintiff Stewart-Warner Corporation became, by lawful assignments, and now is the sole owner of said United States patents Nos. 1,593,791 and 1,408,573 and of all rights thereunder and of all rights of action for infringement thereof. Proffert is hereby made of the original instruments upon which plaintiff Stewart-Warner Corporation's title is based.

(8) The inventions patented by said patents Nos. 1,593,791 and 1,408,573 are of great utility and are of great value to plaintiff, and of great benefit to the public Plaintiff Stewart-Warner Corporation and its predecessors have sold very extensively and introduced into public use, devices in which said patented inventions are embodied, and the public and manufacturers have demanded and purchased from plaintiff Stewart-Warner Corporation and its predecessors, such devices embodying said inventions in very large and in very rapidly increasing quantities.

(9) Plaintiff alleges, upon information and belief, that plaintiff Stewart-Warner Corporation and its predecessors have marked all devices embodying said inventions made or sold by them in full compliance with the United States statutes.

(10) The public has, in general, acknowledged the validity of the aforesaid patents Nos. 1,593,791 and 1,408,573 and has respected plaintiff's rights therein and thereunder.

(11) Heretofore, to-wit, on May 17, 1930, Alemite Corporation, predecessor of plaintiff, brought a suit against The Grease Rite Corporation, in the United States District Court at Chicago, Illinois. The said suit came on for final hearing upon Butler patent No. 1,593,791, Parrott patent No. 1,711,903, and Murphy patent No. 1,716,501, and the court, after hearing the evidence offered on behalf of both sides, and upon briefs, rendered an opinion and entered a decree sustaining said patents and finding that they were infringed. As appears in said decree, entered on or about February 15, 1933, claim 1 of said Butler patent No. 1,593,791 was held valid and infringed.

12. Plaintiff alleges, upon information and belief, that defendants, and each of them, in violation of plaintiff's rights under said patents Nos. 1,593,791 and 1,408,573, and without any authority since the issuance of said patents, and within six years before the commencement of this suit within the jurisdiction of this court and elsewhere in the United States,

have severally and jointly threatened to infringe and
56 have severally and jointly infringed said patents Nos. 1,593,791 and 1,408,573, by making and/or using and/or selling lubricating apparatus embodying said patented inventions and by making and/or using and/or vending devices designed and intended for use in apparatus embodying said patented inventions. Defendants threaten to continue to commit acts in violation of plaintiff's rights and in infringement of said patents, whereby plaintiff has been and will be greatly and irreparably damaged, and whereby defendants are about to obtain large profits which in equity will belong to plaintiff, the amount of which damages and profits plaintiff cannot ascertain except by an accounting.

Plaintiff, Therefore, Prays:

(a) That the defendants be required to answer this amended bill of complaint, but not under oath, answer under oath being hereby expressly waived.

(b) That the court grant a preliminary injunction pending this suit, and a permanent injunction against the defendants,

their agents, employees, associates and confederates, enjoining and restraining them from making and/or using and/or vending the combinations patented in said patents, or any of the parts thereof, or any other device or devices embodying, or adapted or intended for use in apparatus embodying the inventions claimed in said patents, either for original equipment or for replacement under the guise of "repairs" or otherwise, and from offering or advertising so to do, and from aiding or abetting or in any other way contributing to the infringement of said patents.

57 (c) That this cause be referred to a Master to take and report an account of damages and profits accruing from defendants' infringement of said patents, and that plaintiff have judgment for the damages and profits so found and for the costs of this suit.

(d) That plaintiff have such other and further relief as equity may require.

Stewart-Warner Corporation
By Wilkins, Bradbury, McCaleb & Hinkle
Lynn A. Williams
Solicitors and Counsel for Plaintiff.

July 8, 1935.

Filed July 22, 1935.

58 And on, to wit, the 22nd day of July, 1935 came the Defendants by their attorneys and filed in the Clerk's office of said Court a certain Answer to Amended Bill of Complaint in words and figures following, to wit:

59 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

ANSWER TO AMENDED BILL OF COMPLAINT.

Come now defendants and make answer to the amended bill of complaint as follows:

1. Defendants are without knowledge as to the allegations in paragraph 1 of the amended bill of complaint, and leave plaintiff to its proofs.

2. Defendants admit that defendants John R. LeVally and Frederick A. Faville are citizens of the United States and of the State of Illinois, and residents of the State of Illinois, and that they are doing business as Lincoln Engineering

Company of Illinois, located at 4521 South Cottage Grove Avenue, in the City of Chicago and State of Illinois, within the Northern District of Illinois, Eastern Division; but defendants deny that they have committed any acts of infringement of plaintiff's patents of which complaint is made in the amended bill of complaint. Defendants admit that the allegations in the last section of paragraph 2 of the amended bill of complaint.

60 3. Defendants admit that this is a suit in equity, arising under the patent laws of the United States, but deny that plaintiff is entitled to any remedy, and deny that plaintiff has no adequate remedy at law.

4. Defendants deny that Clyde G. Butler was the original, first, and/or sole inventor of certain new and useful improvements in lubricating apparatus; and deny that he lawfully filed and/or prosecuted an application for United States patent therefor; defendants admit that United States patent No. 1,593,791 was granted on July 27, 1926, but deny that the statutes and rules of the Patent Office were duly complied with.

5. Defendants deny that Douglas F. Fesler was the original, first, and/or sole inventor of certain new and useful improvements in lubricating systems; defendants admit that an application for United States patent therefor was filed and prosecuted, but deny that said filing and/or prosecution was lawful; defendants admit that United States patent No. 1,408,573 was granted on March 7, 1922, but deny that the statutes and/or rules of the Patent Office were duly complied with.

6. Defendants deny that the alleged inventions of said Clyde G. Butler and/or Douglas F. Fesler were new and/or useful, and/or not known or used by others in this country before their respective alleged inventions, and/or not patented or described in any printed publication anywhere before their respective alleged inventions, or more than two years prior to their respective applications for said Letters

61 Patent, and/or not in public use and/or on sale in this country for more than two years prior to their said applications for Letters Patent, and/or not patented in any foreign country by them or their legal representatives on applications filed more than one year before their said applications in this country, and/or not abandoned. Defendants deny that said patents are now in full force.

7. Defendants are without knowledge as to the allegations

in paragraph 7 of the amended bill of complaint, and leave plaintiff to its proofs.

8. Defendants deny the allegations in paragraph 8 of the amended bill of complaint.

9. Defendants deny that plaintiff Stewart-Warner Corporation and/or its predecessors have marked all devices embodying said alleged inventions made or sold by them, in full compliance with the United States statutes.

10. Defendants deny the allegations in paragraph 10 of the amended bill of complaint.

11. Defendants are without knowledge as to the allegations in paragraph 11 of the amended bill of complaint, and leave plaintiff to its proofs.

12. Defendants deny the allegations in paragraph 12 of the amended bill of complaint.

13. Defendants aver:

First: That for the purpose of deceiving the public the respective descriptions and specifications filed by the patentees Clyde G. Butler and Douglas F. Fesler in the Pat-
62 ent Office were made to contain less than the whole truth relative to their invention or discovery alleged to be disclosed in said patents 1,593,791 and 1,408,573 respectively, or more than is necessary to produce the desired effect.

Second: That the said Clyde G. Butler and Douglas F. Fesler had surreptitiously or unjustly obtained the said patents 1,593,791 and 1,408,573 respectively, for that which was in fact invented by others, who were using reasonable diligence in adapting and perfecting the same.

Third: That the alleged inventions of said patents 1,593,791 and 1,408,573 had been patented or described in printed publications prior to Butler's and Fesler's respective supposed invention or discovery thereof, or more than two years prior to their respective applications for patents therefor.

Fourth: That the said Clyde G. Butler and Douglas F. Fesler were not respectively the original and first inventors or discoverers of any material and substantial part of the things patented, or alleged to be patented, in said patents 1,593,791 and 1,408,573, respectively.

Fifth: That the respective alleged inventions of said patents 1,593,791 and 1,408,573 had been in public use and/or on sale in this country for more than two years before the respective applications for said patents, or had been abandoned to the public.

63 Sixth: As to sections First, Second, Third, Fourth and Fifth of this paragraph thirteen, names of the pat-

entees and the dates of their patents, and when granted, and the names and residences of the persons alleged to have invented or to have had the prior knowledge of the things patented, and where and by whom said things had been used are at present unknown to defendants in sufficient detail, but which when ascertained, defendants pray leave to insert in this answer by amendment thereto.

14. Defendants aver that the things patented in said patents were not novel or useful within the meaning of the patent statutes, but, in view of the art then existing, involved merely the skill of one skilled in the art.

15. Defendants deny that they have damaged or injured plaintiff in any manner or form whatsoever, and deny that plaintiff is entitled to have or recover any profits or damages or the costs of this action, and deny that plaintiff is entitled to any relief whatsoever from defendants.

64 16. Wherefore, defendants prays (a) that each and every prayer of said amended bill of complaint be denied; (b) that said bill be dismissed; (c) that defendants' costs and disbursements be taxed against plaintiff; (d) that defendants have judgment for said costs and disbursements, and that execution issue therefor; and (e) that defendants have such other and further relief as may be appropriate under the circumstances.

John R. LeVally and Frederick A. Faville,
doing business as Lincoln Engineering
Company of Illinois, and Lincoln Engineering Co. of Illinois,
By Delos G. Haynes,
L. R. Koenig,
Counsel,
818 Olive Street,
St. Louis, Missouri.

Wilkinson, Huxley, Byron & Knight,
Attorneys,
38 South Dearborn Street,
Chicago, Illinois.

Service of the above answer and receipt of a copy thereof is hereby admitted this 22 day of July, 1935.

Williams, Bradbury, McCaleb & Hinkle,
Attorneys for Plaintiff.

Entered Aug. 19, 1936.

65 And afterwards, to wit, on the 19th day of August, 1935, being one of the days of the regular July term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable Phillip L. Sullivan, District Judge appears the following entry, to wit:

66 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

ORDER.

This cause came on to be heard at this time on defendants' motion for leave to file an amendment to its answer; said motion was submitted by counsel; and thereupon upon consideration thereof, it was ordered that said motion be and the same is hereby granted.

Philip L. Sullivan,
United States District Judge.

August ____, 1935.

Plaintiff does not oppose the entry the foregoing order.

Williams, Bradbury, McCaleb & Hinkle,
Attorneys for Plaintiff.

Filed Aug. 19, 1936.

67 And on, to wit, the 19th day of August, 1936 came the Defendants by their attorneys and filed in the Clerk's office of said Court a certain Amendment to Defendants' Answers in words and figures following, to wit:

68 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

AMENDMENT TO DEFENDANTS' ANSWER.

Now comes defendants, and amend their answer heretofore filed, by striking therefrom paragraph 13 thereof and substituting the following:

13. Defendants aver:

First: That for the purpose of deceiving the public the respective descriptions and specifications filed by the patentees Clyde G. Butler and Douglas F. Fesler in the Patent Office were made to contain less than the whole truth relative to their respective inventions or discoveries alleged to be disclosed in said patents 1,593,791 and 1,408,573 respectively, or more than is necessary to produce the desired effects.

Second: That the said Clyde G. Butler and Douglas F. Fesler had surreptitiously or unjustly obtained the said patents 1,593,791 and 1,408,573 respectively, for that which was

in fact invented by others, who were using reasonable diligence in adapting and perfecting the same.

69 Third: That the alleged inventions of said patents 1,593,791 and 1,408,573 had been patented or described in printed publications prior to Butler's or Fesler's respective supposed inventions or discoveries thereof, or more than two years prior to their respective applications for patents therefor; that the names of patentees and numbers and dates of their patents; and the titles and other identifying data of other publications, as alleged in this section "Third" include the following:

Anticipating Butler patent 1,593,791:

German patent No. 255,945, issued to Adolf Lanzdorf, of Vienna; published January 27, 1913, for Automatic Railway Carriage Coupling;

French patent No. 327,557, issued to M. Pinel; published June 26, 1903, for Instantaneous Pipe Coupling System;

U. S. patent No. 621,276, issued to Henry O. Paul, of Clear Lake, Iowa; published March 14, 1899, for Hose Coupling;

U. S. patent No. 1,118,876, issued to Robert S. Newton of Watertown, New York; published November 24, 1914, for Hose and Coupling Testing Appliance;

U. S. patent No. 1,253,309, issued to Nels Ulleland, of Kent, Washington; published January 15, 1918, for Quick-Acting Hose-Coupling;

U. S. patent No. 1,466,450, issued to Charles A. Kothe, of Galion, Ohio; published August 28, 1923, for Flue Blowing and Testing Device; and,

70 U. S. patent No. 1,548,333, issued to Charles H. Scott, of South Pasadena, California; published August 4, 1925, for Pipe Coupling.

Anticipating Fesler patent 1,408,573:

German patent No. 27,709, issued to August Bertling, of Rheydt; published July 15, 1884, for Steam Lubricating Device;

French patent No. 327,557, issued to M. Pinel; published June 26, 1903, for Instantaneous Pipe Couplying System (cited above);

U. S. patent No. 632,521, issued to John H. Fox, of New York, N. Y.; published September 5, 1899, for Siphon-Filling Apparatus;

U. S. patent No. 926,761, issued to John G. Oliver, of Cleveland, Ohio; published July 6, 1909, for Lathe-Chuck;

U. S. patent No. 1,075,715, issued to Harlan M. Ludwick,

of Parkersburg, Pennsylvania; published October 14, 1913, for Fluid-Actuated Lathe-Chuck;

U. S. patent No. 1,118,876, issued to Robert S. Newton, of Watertown, New York; published November 24, 1914, for Hose and Coupling Testing Appliance (cited above); and,

U. S. patent No. 1,250,036, issued to Thomas Shipley, of York, Pennsylvania; published December 11, 1917, for Oiling Apparatus.

71 Fourth: That the said Clyde G. Butler and Douglas F. Fesler were not respectively the original and first inventors or discoverers of any material and substantial parts of the respective things patented, or alleged to have been patented, in said patents 1,593,791 and 1,408,573 respectively, as shown by the prior patents and publications set forth in Section "Third" hereof.

Fifth: That the alleged inventions of said patents 1,593,791 and 1,408,573 had been in public use or on sale in this country for more than two years before the respective applications for said patents, or had been abandoned to the public.

Sixth: As to sections "Second" and "Fifth" of this amended paragraph 13, the names and residences of the persons alleged to have invented or to have had the prior knowledge of the things patented, and where and by whom said things had been used are at present unknown in sufficient detail to defendants, but when ascertained, defendants pray leave to insert by further suitable amendment to the Answer.

72 Seventh: As to Section "Third" of this amended paragraph 13, defendants pray leave to insert additional names of patentees and the numbers and dates of their patents, and when granted, and the names and identifications of other publications at present unknown to defendants, when ascertained by defendants.

John R. Le Vally and Frederick A. Faville,
doing business as Lincoln Engineering
Company of Illinois, and Lincoln Engineering Company of Illinois.

By Delos G. Haynes,
Lloyd R. Koenig,
Counsel,
818 Olive St.,
St. Louis, Missouri.

Wilkinson, Huxley, Byron & Knight,
Attorneys,
38 South Dearborn Street,
Chicago, Illinois.

Service of the above answer and receipt of a copy thereof is hereby admitted this 16th day of August, 1935.

Williams, Bradbury, McCaleb & Hinkle,
Attorneys for Plaintiff.

73 And on, to wit, the 30th day of November, 1936, came the Defendant by its attorneys and filed in the Clerk's office of said Court a certain Condensed Statement of Evidence in words and figures following, to wit: Statement of Evidence filed Nov. 30, 1936.

74 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—13955) * *

CONDENSED STATEMENT OF EVIDENCE.

Lodged Nov. 16, 1936, at 10:50 o'clock A. M. Filed Nov. 30, 1936. Henry W. Freeman, Clerk.

1 75 Proceedings had and evidence taken in the above entitled case before the Honorable Walter C. Lindley of Tuesday, April 14, 1936.

Appearances:

Messrs. Williams, Bradbury, McCaleb & Hinkle, by Mr. Lynn A. Williams, representing Plaintiff;

Messrs. Wilkinson, Huxley, Byron & Knight, Mr. Delos G. Haynes and Mr. Lloyd R. Koenig, representing Defendants.

2 Opening Statement by Mr. Williams.

3 Plaintiff moves to dismiss the bill of complaint without prejudice as to the Fesler patent in suit.

Plaintiff wishes to amend or have regarded as amended its bill of particular insofar as said bill alleges infringement of the Butler patent in suit by the sale of defendant's automatic coupler. That will leave at issue in this suit the Butler patent, and there we shall rely on claim 2 only, and our claim of infringement will be limited to the charge directed toward the sale by the Lincoln Engineering Company of Illinois of certain lubricating fittings which are designated by the defendant as the "Lincoln Kleenseal" fittings.

4 76 Now, as to the Lincoln Company's sales of those fittings, we have a situation of the kind which has

been involved in many many suits involving patents covering the lubricating equipment manufactured and sold by
6 the plaintiff. Some people grease their own automobiles, others go to service stations or garages to have them greased so that the sales of the compressor and coupler parts are sometimes to the car owner, I mean ultimately, sometimes to the garage man or service station man, who with the gun and coupler part of the equipment may grease automobiles which come into his place of business,
7 and where the bearings are already provided with the fitting parts. The charge against the defendant here has to do with its sales of fittings.

The charge is, of course, that of contributory infringement. It involves the charge that the defendant has sold a fitting part for use with the compressor and coupler
8 parts as sold by the plaintiff.

10 "Mr. Haynes: I would like to ask Mr. Williams just one or two questions about the amendment to the pleadings that he announced without any previous notice to me.

"Mr. Williams, do I understand that you are withdrawing the Fesler patent from this suit?

"Mr. Williams: Yes.

"Mr. Haynes: Your Honor, we are here for trial on the Fesler patent. I cannot compel plaintiff to go to trial, but I do submit that the withdrawal should be with prejudice. This Fesler patent has been in this suit for a couple of years. They have put us to the expense of getting ready for trial. We are here ready for trial on that patent, and I do think it is unfair to permit them to dismiss it without prejudice.

77 "The Court: I think they might dismiss the entire bill without prejudice, the entire bill or any part of it. It is an amendment before decree, but that does not affect, of course, any question that may arise as to the taxability of costs.

"Mr. Williams: I am willing to agree that it should be at our costs.

11 "The Court: Of course any costs that are taxable under the law because of the dismissal can be taken care of by the Court hereafter, and the dismissal is without prejudice. You may raise your question as to the liability of the plaintiff for any costs that you have incurred.

"Mr. Haynes: Yes, sir.

"(Addressing Mr. Williams) Do I understand that Butler claim 1 is not being relied upon?

"Mr. Williams: That is right.

"Mr. Haynes: Do I understand that the defendants' so-called ND5 apparatus is not being relied upon? That is specified in the bill of particulars as something that is relied upon, if my memory is right.

"Mr. Williams: If I know what ND5 is, that is, if it is what I call the coupler with the relief valve, that is not now relied upon. I don't think we misunderstand about that.

"Mr. Haynes: If I may have just a moment, your Honor. This suit is being defended by my client, the Lincoln Engineering Company, a Missouri corporation, located in St. Louis, Missouri. My client is not a party to the suit. The defendants in the suit are Chicago distributors for my client.

"The Court: Your client, yes.

12 78 "Mr. Haynes: My silence on the points mentioned by Mr. Williams, of course, ought not to be taken as an admission that any of those statements are true.

"The Court: Certainly not."

Whereupon the plaintiff, to maintain the issues on its behalf, introduced the following evidence:

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 1, a certified copy of the Articles of Incorporation of the Bassick Manufacturing Company.)

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 2, a certificate of the change of name of the Bassick Manufacturing Company and of the change of name of Alemite Manufacturing Corporation to Alemite Corporation.)

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 3, a certified copy of the Articles of Incorporation
13 of the Stewart-Warner Speedometer Corporation, together with a certificate of the change of name of Stewart-Warner Speedometer Corporation to Stewart-Warner Corporation.)

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 4, a certified copy of the Butler patent in suit No. 1,593,791.)

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 5, a document purporting to be the assignment

of Clyde G. Butler to Cincinnati Ball Crank Company of Butler patent 1,593,791.)

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 6, an assignment from Cincinnati Ball Crank Company to the Bassick Manufacturing Company of Butler patent 1,593,791.)

14 (Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 7, an assignment from Alemite Corporation to Stewart-Warner Corporation of Butler patent No. 1,593,791, duly acknowledged.

15 CLYDE G. BUTLER, Witness for Plaintiff:

Direct Examination by Mr. Williams.

My name is Clyde G. Butler. I live in Cincinnati,
79 Ohio. My age is 58. I am the Clyde G. Butler who applied for this patent in suit No. 1,593,791.

The piece of apparatus which you now hand me is a connector or chuck for connecting the nipple or fitting that is on an automobile, and this is being connected between there to make a connection between the job, to move the lubricant there through.

16 Referring to the Butler patent, this part here on the Fig. 2 is represented by this piece which I have in my hand. That was the original model made and used to lubricate a car, or was used to lubricate at the time in which it was made. One or two small parts of the jaws have become lost.

I have now pulled the piston part a little way out of the end of the shell of this coupler. There is a connection between the compressor and the base or body portion of the chuck, which is in connection with a sliding piston, which is located within the barrel, and in connection with that there are three small collars, or sections of a collar, segments, also a cover. Any internal pressure coming in the way toward the fitting builds up a greater pressure on account of the area, causing the piston to move for-
17 ward and clutch the collar or split segments—wedges in there and causes the split segments to drop underneath the head of the fitting, and any additional pressure being built up, and any greater pressure just locks continuously forever tighter and tighter.

There is a sealing member which floats with the piston which contacts the head of the fitting making a seal against any leakage through this conduit or fitting. The samples which I have in my hands were made in the last part of 1921. I referred to a compressor, but I do not
18 have that here. Mr. Wupper has in his possession the exact gun that was used at that time, which I gave Mr. Wupper. That is the one that is screwed to this par-
80 ticular coupler. That was the one I used at the time. Two or three jaws have become lost.

I have very diligently looked for any sample of the fitting part that screwed into the bearing that went with this coupler and have been unable to locate a fitting. After having found that this sample was practical I turned it over to my patent attorneys for an application for a patent. They were Messrs. Toulmin & Toulmin of
19 Dayton, Ohio. Fig. 2 of the drawing corresponds with this original sample which I took to them.

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 8, the apparatus above identified by the witness.)

"Mr. Haynes: I would like to object. I object de bene esse that its origin and history have not been proven, your Honor.

"The Court: It may be received."

Cross-Examination by Mr. Haynes.

I am at present employed by Cincinnati Ball Crank Company. I believe it is a licensee of the plaintiff in this suit. I am not in a position to know. I understand that
20 they are licensed.

"Mr. Williams: I will say they are. I don't think Mr. Butler knows about it.

81 JOSEPH EDWARD OTIS, JR., Witness for Plaintiff:

Direct Examination by Mr. Williams.

My name is Joseph Edward Otis, Jr.; my age is 43; my residence is Chicago. My occupation is President of Stewart-Warner Corporation,
21 As to the Stewart-Warner Corporation's connection

with the lubricating equipment business, and the general relationship between the Stewart-Warner Corporation and its predecessors in the lubricating equipment business: I became familiar with the lubricating business in 1921, at which time the Alemite system was being made by the Bassick Manufacturing Company of Chicago. I became associated with that company at that time,—I think 1922. The Bassick Manufacturing Company was a subsidiary at that time of the Bassick Company of Bridgeport, Connecticut. Shortly after my association with the company, or about coincidental with it the Eastern division and the Bassick Manufacturing Company of Chicago were consolidated into the Bassick Alemite Corporation which was bought by Stewart-Warner in 1925. It was consolidated physically with Stewart-Warner since 1930—I have forgotten just when—1932 I think. The corporate identity of the former Bassick Manufacturing Company, changed to the Alemite Corporation,
22 was consolidated with Stewart-Warner and it is now operated as a division of the Stewart-Warner Corporation.

You have just shown me one of the original Alemite lubricating systems, consisting of a screw-type compressor, a flexible hose or conduit terminating in a bayonet coupler, which is intended to connect with this so-called Alemite pin-type fitting.

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 9, the above devices, marked A for the compressor, conduit and coupler, and B, C and D for the three nipples or fittings.)

82 I am familiar with the Gullborg patent No. 1,307,734. This pin-type Alemite equipment, which I have just identified, corresponds with the disclosure of that Gullborg patent.

As to when any lubricating equipment under Zerk pat-
23 ent No. 1,475,980 was brought out: Stewart-Warner or its predecessors did not actually bring it out, it was brought out by Allyne-Zerk Company of Cleveland, Ohio. It was subsequently purchased by the Alemite division of Stewart-Warner. Thereafter Stewart-Warner or its subsidiaries, manufactured and sold this Zerk equipment.

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 10, the Gullborg patent 1,307,734.)

24 (Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 11, the Zerk patent 1,475,980.)

In my right hand I have a gun made by the Alemite Corporation in the so-called push type, terminating in a Zerk type or push nozzle. In my left hand I have an assortment of three fittings composing other parts of the system.

(Plaintiff offers in evidence, as PLAINTIFF'S EX-
25 HIBIT 12, the compressor and nozzle part of the above, to be marked 12-A and the three fittings as B, C and D.)

As to the extent to which this Gullborg-type equipment was sold by Stewart-Warner or the several predecessors
26 which manufactured it: it became in general use shortly after its introduction on automobiles, and very rapidly in the industrial field as well, and replaced the old fashioned grease cups and oil cups in many instances. From the time of its introduction in 1919, to 1933, the corporation had made and sold 559,761,000 fittings. They had made and sold 17,778,000 couplers for use with these fittings. That includes the gun. The total value of this equipment represented about $45,000,000.

83 The push type equipment under the Zerk patent was introduced to the market in 1925. The com-
27 pressors sold up to 1933 were 13,750,000; fittings, 454,900,000. These had a dollar value of $22,000,000. This value was the receipts from sales. I have here a gun manufactured by the Alemite division of Stewart-Warner Corporation known as the Alemite hydraulic gun, terminating in a so-called hydraulic nozzle, and in the bag are an assortment of hydraulic fittings designed so that the gun—the nozzle of the gun will contact them and hold itself on there by the three jaws on the coupler.

I have here in a bag many different types of Alemite hydraulic fittings. I do not know exactly how many types are made, but I would say that these would fairly
28 represent the various types. Some of them are long, some of them are short, all various angles and various threads. I would say this represents an assortment.

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 13, the compressor and hydraulic nozzle part of the above equipment; and as PLAITNIFF'S EXHIBIT 14, the assortment of fittings.)

This bag (Plaintiff's Exhibit 14) contains seventy-nine different types or styles of Alemite hydraulic fittings.

They are made in different lengths in order that the point of lubrication in a piece of machinery or an automobile might be brought out to a point of easy access. They are made in angles for the same reason. Some of these fittings are made with caps and double barrel chucks, so that they can be used in lubricating places like
29 water pumps on an automobile where any leakage of the water has to be eliminated. They terminate in various types of threads for various size cap holes. Some of them have no threads at all. Those are to be driven into oil holes which are not threaded, that is, in general the various reasons. I have here six other fittings. These are Alemite hydraulic straight fittings. They are
84 duplicates of one of the simpler, more widely used fittings of the above assortment.

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 15, the above six Alemite hydraulic straight fittings.)

The Stewart-Warner Corporation began to sell this
30 Alemite hydraulic equipment in the spring of 1933. The sales of the hydraulic fittings since their introduction in April, 1933, through March 31st of this year total 218,555,000. The sales of Alemite hydraulic couplers amount to 6,306,000. Down to the first of April, 1935, 2,385,148 Alemite hydraulic couplers had been sold.

The Alemite hydraulic couplers have been sold in association with compressors of sizes and kinds other than that exemplified in Plaintiff's Exhibit 13.

I have here a hand operated service gun manufactured by the Stewart-Warner Corporation, Alemite Division. This terminates in one of the Alemite hydraulic couplers or nozzles.

31 (Plaintiff offers in evidence the above device as PLAINTIFF'S EXHIBIT 16.)

I have here another so-called hand operated service compressor, terminating in an Alemite hydraulic nozzle.

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 17, the above Alemite device.)

I have here a small gun terminating in the same type of nozzle similar to the guns used in tool kits of the cheaper automobiles.

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 18, the above device.)

32 I have here a slightly more expensive gun designed pri-

marily for use by truck or automobile manufacturers, or small farm implements. This terminates in one of these Alemite hydraulic couplers.

85 (Plaintiff offers in evidence, as PLAINTIFF EXHIBIT 19, the above device.)

I have here a piece of service station equipment, so-called, operated by electricity, holding about 15 pounds of lubricant, also terminating in the Alemite hydraulic nozzle and release valve.

(Plaintiff offers in evidence the above device as PLAINTIFF'S EXHIBIT 20.)

The gun and coupler parts, like Plaintiff's Exhibit 18 and 19, are used in the tool kits of automobiles or in the tool kits of trucks. The Alemite hydraulic compressors

33 like Plaintiff's Exhibits 16 and 17 are used in service stations. By that I mean a place where they render service to automobiles. It might be a station owned by an oil company or an independent operator, selling gasoline and oil and automobile service, or a garage, or an automobile dealer's place of business. Any place where they render service to automobiles in the way of greasing and oiling.

The compressor parts of this Alemite hydraulic equipment are made in other sizes and styles in addition to the four or five which I have particularly identified. I have here the catalogs of this lubricating equipment. They illustrate and described the other styles and sizes in which the compressor and coupler part of this Alemite hydraulic equipment is manufactured and sold.

34 (Plaintiff offers the above documents in evidence as PLAINTIFF'S EXHIBIT 21, the three circulars or catalogs to be marked, respectively, A, B and C.)

86 I have here an Alemite adapter, designed to adapt a compressor or hose terminating in an Alemite bayonet coupling for use on the hydraulic fittings.

35 I have here an Alemite pin type adapter. I mean a coupler, bayonet type, Plaintiff's Exhibit 9-A. In order that this gun may be equipped to service the hydraulic fittings which are now on automobiles this adapter was made and distributed, and it terminates on one end with a pin type fitting and on the other with a hydraulic nozzle. By putting this fitting in and screwing this narrow nut up, it makes or converts this gun from an Alemite pin type gun to a hydraulic. With this adapter in place I demonstrate how the connection may be made with one

of the Alemite hydraulic fittings. The gun, the nozzle, can be contacted with the fitting and pushed on and then the process of lubrication can be started.

(Plaintiff offers the above pin type to hydraulic adapter in evidence as PLAINTIFF'S EXHIBIT 22.)

36 I have here the same thing in another style; pin type to hydraulic adapter, particularly designed for use on the end of a hose, such as that indicated or represented in Plaintiff's Exhibit 20, except that this terminates in the Alemite hydraulic coupler.

(Plaintiff offers the above in evidence as PLAINTIFF'S EXHIBIT 23.)

I have here the same pin type to hydraulic adapter with a right-angle bend in it.

(Plaintiff offers the above in evidence as PLAINTIFF'S EXHIBIT 24.)

I have here a hydraulic coupling. I don't believe it is an adapter. This is intended to screw into a thread of some kind here. This is identically the same form as all

37 of the other Alemite hydraulic couplers. I did not

87 look at the business end of the others, but it looks very much like it except, probably, this one has that small needle nozzle inside of it. I did not notice whether the others did or not. Some do have it and some do not.

(Plaintiff offers the above in evidence as PLAINTIFF'S EXHIBIT 25.)

"Q. Now, with the direct sales of compressors terminating in Alemite hydraulic couplers, and with the sales of these adapters for making compressors terminating in Gullborg pin type couplers available for use in Alemite hydraulic couplers, to what extent were the garages and the service stations, the public greasing establishments in this country, supplied with compressor and coupler parts of the hydraulic equipment?

"A. Why, I would say generally. It had become a

38 common tool and if anybody was in the business of servicing an automobile he would have to have one.

"Q. And having it, he could grease cars whose bearings were equipped with the Alemite hydraulic fittings?

"A. He would have to get the pin type to hydraulic adapter, which we made readily available all over the country."

That is by the use of the adapter or by the purchase

of guns terminating directly in Alemite hydraulic couplers.

Of the six million Alemite hydraulic guns and couplers which have been sold down to March 31, 1936, 4,485,000 were sold to automobile manufacturers to be put in the tool kits of cars.

39 I have here an old-fashioned grease cup of the kind which I mentioned during this testimony.

(Plaintiff offers the above in evidence as PLAINTIFF'S EXHIBIT 26.)

88 *Cross-Examination by Mr. Haynes.*

"Q. Mr. Otis, approximately how many of the so-called Zerk nozzles or couplers were in usable condition in this country at the time you first put on the market your Alemite hydraulic fittings?

"A. I will see if I have any figure like that, Mr. Haynes. I don't know how it is possible to tell how many were in actual use. I can tell you how many were sold, and they don't wear out very readily, so I imagine there were probably in the neighborhood of fourteen or fifteen million.

"Q. Most of them used in this country, so far as you
40 know? In the United States?

"A. I would say practically all of them."

89 NELSON CORNELL, Witness for plaintiff:

Direct Examination by Mr. Williams.

My name is Nelson Cornell. My age is 23. My residence is Chicago. I am a law clerk, employed in the office of Mr. Williams, plaintiff's attorney.

I engaged in a business transaction with the defendant. Lincoln Engineering Company of Illinois. This is what happened: I entered the place of business of the Lincoln Engineering Company at Cottage Grove Avenue and was
41 waited on by a man behind the counter who asked me what I wanted. I told him I wanted to purchase some fitttings to be used with a gun, which I showed him. This is the gun that I handed the man who waited on me, and told him that I wanted to purchase ten straight fittings

and ten elbow fittings to be used with this gun. He looked at the gun and said, "All right," and went back to the stockroom which was in the rear of the store and returned with two cards containing the fittings, and I tried them with the gun, and he asked me where I was from, and I told him, "Cornell Forge Company." He made out a sales slip and I paid for the fittings, and that concluded the transaction.

This gun that I showed to the man is marked with the title of this suit, in my handwriting, identified in connection with an affidavit. It is marked Plaintiff's Exhibit 18 in this suit.

I have here the fittings which constituted the subject matter of the purchase I made from the Lincoln Engineering Company. These are mounted on two cards.

(Plaintiff offers the above cards in evidence as PLAINTIFF'S EXHIBIT 27, the card containing ten straight fittings to be marked 27-A, and the card containing ten angle fittings to be marked 27-B.)

The above transaction occurred on April 17, 1935.

I have made other purchases of similar fittings from this same concern since that time. They were like those which I have produced here.

(No cross-examination.)

(Plaintiff offers in evidence its interrogatory No. 6, filed May 29, 1935, and the answer thereto by Frederick A. Faville, president of the Lincoln Engineering Company of Illinois, filed on or about June 11, 1935, as follows:

"Did the defendant Lincoln Engineering Company of Illinois within six years prior to the filing of the supplemental bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the Lincoln 'Kleenseal' lubricant receiving fittings No. 5,000 and No. 5,300, which may be inspected at the office of the plaintiff's solicitors?"

The answer to that question:

"Yes, or a duplicate thereof."

By Mr. Williams. "These "Kleenseal" fittings Nos. 5,000 and 5,300, as submitted with those interrogatories, are in evidence, respectively, as Plf. Exh. 27-A and 27-B.

44 91 LYNN A. WILLIAMS, JR., Witness for Plaintiff:

Direct Examination by Mr. Williams.

My name is Lynn A. Williams, Jr. I am 27 years old. I live in Winnetka, Illinois. As to my occupation: At the present time I am sort of a technical assistant to Mr. Otis, who is the president of Stewart-Warner Corporation. I have been connected with the Stewart-Warner Corporation since July 1933, devoting all of my time to its business and affairs. In that connection I have become familiar with the lubricating equipment sold by it.

I am familiar with the Butler patent in suit. I have
45 heard the testimony and have seen the exhibits that have been offered this morning. I am familiar with them.

My understanding of the construction and mode of operation of the apparatus shown in the Butler patent is: The Butler patent relates to a lubricating system consisting of fittings or nipples to be attached to bearings by screw thread connections, or otherwise, and a coupler for making connection with that fitting or those fittings, and a lubricant compressor for forcing grease under pressure through the conduit which connects it to the coupler and through the coupler to the fitting or nipple.

Now, in the drawings Fig. 1 and 2 illustrate the construction of the Butler system. Now, Fig. 1 represents a screw type compressor in which by turning the handle a piston part is forced toward the outlet end of the compressor and thence into the conduit 49, which is shown continued in Fig. 2.

92 That is the conduit, as we look at the drawing,
46 with the compressor away from us, appears at the left side of Fig. 2, and there makes a connection with the coupler parts.

Now the coupler consists, stating it generally first, of a means for making a sealed connection against the end of the nipple or fitting, together with an automatic means for making a grip onto the fitting. Without going into too much detail about that operation at the present time, I should like to point out that prior to the Butler invention there was no means for making this automatic connection to a lubricating nipple in a lubricating system.

Perhaps I can illustrate that best by referring just briefly to the operation of the pin type or Gullborg system, which was in general use prior to Butler. Here I have a representation of an automobile spring having a pin type fitting and a Zerk or push type fitting and a hydraulic fitting.

Now, the connection of the pin type coupler is made by placing the bayonet coupler over the fitting, pushing it on and then screwing it. Then the compressor is op-
47 erated to force grease down into the bearing.

Now, that was a very useful and a very practical system, certainly, as compared with what was in use before, the old-fashioned grease cup, but it had this disadvantage, that in order to make this connection a man has to take this bayonet coupler and go right into the fitting.

His hand has to be right next to it in order to op-
93 erate it. This hose is too flexible and there is a swivel in it, so that you couldn't operate it at any remote distance.

Now, here in this demonstrator that looks very easy. When we consider that these fittings must be placed in inaccessible parts of a car, for example right next to the brake drum, or the shaft, and where there may be a radius rod and spring, and whatever, it is not easy to get one's hand into position to make that connection. It can be done. If it cannot be done readily then some additional tubing or piping is added to the fitting to bring it out to an accessible position. That, of course, is expensive.

Now also, of course, a man has to take one hand and make this connection, meanwhile holding the balance of the apparatus, and then do his compressor operation.

48 As contrasted with that, which is a two-hand operation which calls for the placing of the hand right on the fitting in an inaccessible, dirty, cramped place, we have the Zerk system, which does not have any interlocking connections between the coupler parts and the fitting parts. That connection is made simply by manual pressure, or holding the two parts together. That means that you can go in from some distance, get onto the fitting, make the contact and by manual pressure make the seal, and then pump the grease and the grease can go in.

That was an advantage over the Gullborg system, but

it had a disadvantage which was quite serious, or became quite serious, and that was this, that there is always a tendency of the greasing pressure to disrupt the two parts that are making the sealed connection.

94 That is based upon the fundamental principle, and perhaps I ought to go into that a little bit because it is important all through the consideration of this patent. That is this, that any liquid under pressure tends to exert that pressure equally in all directions and equally throughout its mass.

49 That means if we take this Zerk coupler, for example, that here when we make this connection between the concavely spherical cup and the end of the fitting we have an era there equal to the area of the end of the fitting, and the grease pressure—which is not 100 pounds, like water in the city mains, usually it is less than that in the city water mains; or it is not like air pressure or steam pressure—it is on the order of five tons, 10,000 pounds, per square inch, and while, to be sure, this is not a full square inch, it is a part of a square inch, and whatever fraction that is of a square inch, that fraction of pounds of pressure will tend to force these two things apart.

As a practical matter, with the Zerk system one can obtain pressure of, oh, perhaps 1,500 to 2,500 pounds. It depends upon how strong a man is, how strongly he can hold against that disrupting tendency. And, of course, what he could hold for one instant he couldn't do all day, if he were in a greasing station.

Now, if I operate this Zerk gun against a Zerk fitting which is placed in this gauge block you will see that if I operate it as hard as I can I am getting about 3,000

50 pounds, and to do that I exerted all my effort. A stronger person could probably get a little more, but he couldn't do it all day.

95 Now, that pressure in and of itself has a good deal of utility in greasing automobiles, particularly where it is desirable to lubricate them in a hurry, and that is the case in commercial or service station operation. Now, of course, if a man is doing it at home on Sunday he can get along a good part of the time with 1,000 or 500 pounds, because the grease will ooze in slowly and find its way into the bearings. That low pressure does not cleanse the bearings as much as a sudden surge of grease at high pressure. In addition to that, we sometimes encounter

what we call a locked bearing. The grit and gumbo mixed up with the grease causes it to form a hard cake, and you can't get that grease out with low pressure. In fact you can't do anything. Now you can't get any grease in and you can't clean it. And in those situations it is absolutely necessary to have high pressure.

But again I say, of most importance comes the desire to do the job in a hurry and also to get the cleansing action. So that with the growth of commercial greasing it became more and more important to have some kind of
51 a system which you could use at high pressure, as you can with the Gullborg systems. Perhaps I neglected to say that, but we can use this Gullborg system at tremendously high pressure because this disrupting tendency is held against by the cross pin and bayonet connection, which is rather a straight-forward kind of way of holding against it.

96 In order to provide something better than this Gullborg system a good many people contrived all sorts of spring latches. Some people have remote control handles, where you have some kind of a hooked means and a method back here of making your hook-on, and let the grease go through. All those connections are just no good, as a practical matter.

What Butler contributed and what he suggested was that here we have in lubrication a lot of high pressure. Let us use that to make this manual connection to hold against this disrupting tendency. I guess I said "to make this manual connection." Let us use it to make a connection and form a mechanical connection which you don't have to manipulate by hand, in order to effect this mechanical connection. And that in and of itself was a brilliant suggestion.

However, there are a good many problems, as a prac-
52 tical matter, to be overcome before that suggestion can be put into a workable form, and the Butler invention consists of taking that principle and then working it out in such a way that we have an automatic grip as we pump grease, an automatic seal as we pump grease, and both becoming tighter as the pressure increases, so that the automatic grip and the automatic end seal both become more effective as the need for them becomes greater.

97 Mr. Haynes: May I interpose an objection, your Honor? This witness as far as the record shows, is

utterly incompetent to express opinions on what the Butler invention was, or even to praise the brilliance of the invention. Mr. Butler is in court, or was an hour or so ago, and I assume he would be the man to speak on that subject. Plaintiff, for reasons of his own, neglected to ask him such questions. This witness, I submit, is incompetent on such questions.

53 Mr. Williams: I have always been interested in and acquainted with the mechanical operation of things that I have seen in every day life, and have constructed models of one thing and another, built them, operated them.

Then I went to college at Yale where I graduated in 1929. I was in the so-called academic school that Yale University has as a part of it, the Sheffield Scientific School, where I was able to take and where I did take a good many courses in scientific matters.

After graduating from Yale in 1929 I went to the Harvard Law School, where I graduated in 1932. After graduating from Harvard Law School I took a course, or several courses for one academic year, at the Massachusetts Institute of Technology. That work there related to mechanics, scientific subjects generally, had to do with shop practice, production methods, mechanical drawing, physics, electricity.

98 After getting through with my work there in 1933 I took the bar examinations in the early part of the summer of 1933. I was admitted to the bar and was em-

54 ployed by the Stewart-Warner Corporation, at first in its patent department, starting, as I recall, about the middle of August, 1933. I think before I said July, and I was mistaken. I think it was August.

In this work it was my duty to acquaint myself with the products manufactured by the Stewart-Warner Corporation and to acquaint myself as thoroughly as possible with the patents having to do with that business. I had almost daily contact with the various engineers who were engaged in the development and the manufacture of lubricating equipment.

I might say that the lubricating equipment business is a considerable part of what we do, and therefore I devoted a large proportion of my time to a study of that equipment and to the patents relating to it. Part of my work consisted of interviewing inventors, going into the

prior art relating to their inventions, and in general appraising the inventions.

I have worked with their engineers in the development of some of our equipment and am myself a co-inventor of one of the forms of equipment already in evidence.

Perhaps eight months ago I was moved from the patent department, strictly speaking, into a capacity to assist Mr. Otis with regard to technical matters and with
55 regard to patent matters. My duties did not change materially except insofar as perhaps they brought me in closer touch with the business policies of the company.

99 I think I had said that what Butler contrived was a scheme and a means for making an automobile mechanical grip onto a fitting, and an automatic end seal to
56 prevent leakage, and I intended to contrast that with the Gullborg in which there was not this automatic operation, but hand operation was necessary.

Now you observe that with the Zerk system I was able to get a pressure of about 3,000 pounds per square inch. Now, I couldn't get more because very much more would tend to break open that seal and cause a leakage. I couldn't get any more grease in. With the Butler system, as exemplified in the Alemite hydraulic coupler, you can snap that onto the fitting. There is an initial light grip caused by some springs that take hold, there, and then as I operate the compressor you see that I get a pressure of some 7,500 to 8,000 pounds. By moving the coupler to one side the grip is released. The grip, of course, is relaxed as the pressure goes out. As I bend it to one side I break the seal and the grease comes out, relieving the pressure, and then the grip is relaxed, just a little spring holding it, and you take it off very easily. That means, as a practical matter, that a man can come in here, catch this fitting, snap it on, bing, bing, bing, pump his grease in, and come to the next, and put it on underneath without getting his hand in. Here is one away back in here. You can get at it through all sorts of obstructions (indicat-
57 ing). You don't have to get your hand in there, and
100 if you have ever greased a car you know many of the fittings are located in very inaccessible positions, and that becomes more and more pronounced as they streamline them and put all sorts of shields and hoods underneath and on the sides, making it more and more

difficult to get at the fittings, so that it is more and more difficult to get your hand in there to make that connection.

Now, with that background I should like to show, by reference to the Butler patent drawings, just how this system operates. The grease leaves the compressor in Fig. 1 through the conduit 49 and comes down at the left hand side of Fig. 2. The first thing that happens as that grease comes through that conduit and into the space that I am pointing out here, Number 50, is to fill up that space. There is an opening from that space Number 48, but that opening is rather small and the grease is coming through that conduit faster than the viscous grease escapes through that opening 48. As a result it creates an initial pressure in the space 50 which acts against the cup leather 45, which is held in place by suitable washers 44
58 and by a backing plate 43, all constituting a piston assembly, so that as the grease comes in back of that that piston is moved towards the right. As that happens it pushes down another leather 51 against the end of the fitting making a light initial seal so that there won't be leakage.

101 Now, there are several things here happening simultaneously. I am going to have to take them up one at a time. As this piston is moved towards the right your Honor will see that there is an extension 42, some fingers, as Butler calls them, exending towards the right, having beveled edges, and those beveled edges engage some jaws or segments 40, which are free to move inwardly and outwardly radially, so that as that moves towards the right, that is this piston together with these extensions or fingers 42, it wedges those segments radially inward to grip about that peripheral groove on the fitting, and as the pressure becomes greater of course those segments are pushed in tighter and tighter behind this head on the fitting. The head, I think, is marked 41 and the reduced throat, I think, is marked 39. Then, during this same time the grease has been coming through the opening 48 and gets in beyond the sealing
59. washer 51, so that as the pressure is built up there again, that sealing washer is moved slightly toward the right, so that as the pressure becomes greater that sealing washer 51, or end seal, is moved down against the end of the fitting more and more tightly and prevents the leakage of grease.

Perhaps I should explain that the space to the right of the end seal 51 is open so that there is no back pressure in there. That is just open to the atmosphere as a practical matter.

102 Now, perhaps I can illustrate this by showing how this drawing is made. The Butler coupler is here exemplified following closely the dimensions of the patent, but with the exception that this model is, as I recall, twice the size, perhaps it is one and one-half times the size—no, twice the size of the patent drawing. We have drawn in here—after cutting these parts in half we have drawn in on the metal the section line, so that they correspond with the patent drawing. I have here the parts that were left when we cut off half of this.

60 Now, you see here the conduit enters the left hand side just as it does in the patent drawing, and here we have the cup leather 45, which prevents any leakage past and out here without pushing this piston assembly down toward the right.

Here we have this extension, which your Honor will see is this cylindrical piece there, and the end seal here to move slightly in this extension to make a seal against the end of the fitting, which it should be understood will come into this space just to the right of the end seal; and these jaws or segments, one of them is sectioned, that is because one of them was cut in two, and this is not sectioned. That is because it is a complete segment. There are three. As we cut through here we happened to cut through a place where there was already a space between some of those jaws. This one cut right through. Therefore that is sectioned. As this piston moves towards the right this wedging action takes place. It is hard to show here, but as I move it your Honor will see that they pinch in together, and they pinch more tightly. If they did not pinch in there, with the slope on the shoulder, that disrupting pressure which becomes a very seri-

61 103 ous matter, that is a matter of several hundred pounds, would pull the whole coupler and fitting apart and the connection would be broken. O course, your Honor will notice the very close resemblance of this to the drawing. That was made simply by taking calipers, measuring these parts, translating them into metal, and then sawing the thing in half, and then marking in these lines to correspond with the section lines of the patent.

Perhaps I can illustrate the action of this piston. This is to represent the piston of the Butler construction, cup leather 45, the extensions coming down, the washer to hold it in place, the opening 48, inside here a piece of sponge rubber is taken to represent in a general way the end seal member. Here I have the jaws, and perhaps I can hold them apart on my fingers as they would be apart after the insertion of a nipple, or after this is placed on the nipple. Then as this is pressed down and as this finds an abutment against the end wall, those are gripped or forced in together to pinch about the peripheral groove on the fitting behind the cap.

The other figures of the Butler patent relate to various other forms, some parts of which — for example, the
62 nipple in Figure 6 is used with the sytem of Figs. 1 and 2. Figs. 3 and 4 show modifications of the Butler scheme, in which, however, there is this difference, that there is not the automatic grip. Your Honor will see some coarse screw threads there and the intention is that in those the outer sleeve should be screwed up so as to cause the gripping, and that was in effect just about as awkward as in Gullborg's pin type. Fig. 2, as to the coupler, which shows the structure which is represented by these models,
104 there is one point, still talking about the Butler patent, which I should like to point out, and that is that this end seal 51 is free to move slightly so as to adjust itself, as Butler says in the patent, to variations. I think he does not say to variations, but the point of that is that when you make these fittings by the hundreds of millions you can't afford to take the utmost precaution that each one is within a thousandth of an inch like every other one. As a result one fitting may be little shorter, another a little longer. Now, it is easy to see that if this seal 51 were fixed and not free to move, if the fitting were only a thousandth, or perhaps two or three thousandths,
63 shorter than it should be, you would not have any contact and you would not have any seal. On the other hand, if it were too long you would not be able to get the fitting in there. So that Butler says that he provides—the "washer 51 provdies a ready means of adjusting the junction of 38 (that is the fitting) with the remainder of the mechanism and effectively seals the connection so that the lubricant will pass through 48 into 52." 52, I guess, is the bearing or shackle. The point of that is that Butler

has made a system here which is entirely workable and practical from the standpoint of being able to take care of these commercial tolerances which we must have. It also provides an adaptation for wear, which always will occur with these fittings. He refers to that same situation and speaks specifically of the wear in connection with some of these other forms which, however, have the same kind of end seal in them, that is the adjustable end seal, to make that seal connection.

105 I think that is my explanation of what the Butler patent shows and how it works.

(Noon recess.)

64 Comparing this original sample identified by Mr. Butler and marked Plaintiff's Exhibit 8, with the drawings of the Butler patent in suit: The original sample of the Butler coupler construction shows the same construction as we find in the patent drawings. The model has missing from it two of the original three segments, here is one of them and we can see inside here—have you a pair of pliers or a screw driver—the parts corresponding with the piston parts in the drawing.

The cup leather on the outside, which we see is the cup leather 45; this cylindrical part here is the part 42. Inside we can see the sealing leather or end seal 51. This

65 particular sample is somewhat smaller than the actual size of the drawings. There is no reason to know whether or not it was intended that these drawings should be full size or larger than full size, but of course that matter is of small consequence.

Now we notice in this sample and in the drawing of Fig. 2 itself that this projection which engages the segments is a cylindrical projection. Of course, in the drawing it might appear to be two pieces, that, of course, is the case when you cut a cylinder or cylindrical shell in half. The patent specification refers to that projection in one place as spring fingers, which I take to mean that this cylindrical shell has been slitted in several places, enough to provide a plurality of extending fingers. How springy those should be, of course, depends on the use to which the coupler has been put. In general the higher the

106 pressures it is desired to use in the equipment, the stronger the spring fingers must be so they will not flex so easily as to prevent a proper contraction of the segments in engagement with the nipple or fitting.

The drawing, as I say, and also the original model of Butler, do not show any slitting, but there is the fact that in one place the specification refers to it as spring
66 fingers which suggest that—possibly we can only conjecture, perhaps I better not do that. Maybe Butler thought that was a better construction than the one which was not slit.

"Mr. Haynes: Your Honor, may I again respectfully object to the manner in which this witness dilates on what Butler thought or did not think. That is not the issue here, your Honor.

"The Court: No, but it is interwoven with certain other things. It may stand, subject to the objection."

Mr. Williams: I will indicate what I mean by the slitting with reference to this large model of the piston. Here is a large model of the piston and here this has been slit in three places, one is a slit going all the way back to the back plate, one a shorter one going about half way back, and another very short slit. That is to indicate first that if the slit is carried all the way to this back plate that that construction is worthless and entirely inoperative, that is because of the fact that this sealing seat,—when that moves away from the back plate it
107 will open up a space and of course the grease will pour out the minute the seal moves at all, it would
67 provide no way of making a seal to prevent leakage at that point, so we can assume following the intended mode of operation as set forth in the specification that it is not intended to cut slits back here to make a hole and leak grease all over. The longer, of course, we make the slits the more flexible the fingers will be. If we make it as long as this, there will be a certain flexibility; if we make them this long there will be less flexibility; if we make them still very short then we get less flexibility. So that the flexibility of the spring segments or spring fingers should be determined in accordance with the pressures with which it is desired to operate the system.

Such flexibility as the slitting of the cylinder may incorporate into the piston member, allows just a slight adjustment to take care of any out-of-roundness of the fitting. The fitting may not be quite round. If it is slightly oval in shape and not flexible the result would be that the grip would be made upon the widest part of that oval shaped fitting with the result of placing tremendous pres-

sure on the parts and comparatively small areas that would, of course, tend to abrade the plating. These fittings are customarily cadmium plated and once the plating is gone there is a tendency, of course, for the steel
68 or the material to rust. Such flexibility as there may
108 be should be great enough to allow that accommodation to slight out-of-roundness, but not so great as to impair the intended operation of the system as set forth in the patent.

I am reading now claim 2 of the Butler patent in suit, and I am indicating which of the things that I have described are enumerated as constituting the combination of that claim:

"The combination with a headed nipple for receiving lubricant."

That is the nipple, as I recall the number is 38, or 35; at any rate the fitting or nipple which is shown extending into the coupler in Fig. 2.

"A lubricant compressor having a coupling member for connecting said compressor and nipple."

The compressor is the compressor shown in Fig. 1, and the coupler member refers generally to the coupler parts of Fig. 2.

"comprising a cylinder."

The cylinder is the outer shell of the coupler surrounding the part 50.

"a piston moveable within the cylinder,"

The piston is the cup leather and its associated parts 45,
69 43, 44 and 47.

"and having an aperture for the discharge of lubricant thereof,"

The aperature for the discharge of lubricant is the passage 48 extending through the piston.

"an aperatured sealing seat carried by said piston for engagement with the end of the nipple;"

109 That is the end seal 51.

"connecting the piston aperture with a passage through the nipple."

That sealing seat, end seal 51, connects the hole through the fitting or nipple with the aperture 48 through the piston.

"radially movable locking elements carried by the cylinder"—

Those are locking elements or segments 40.

"coacting with the nipple"—

That is they grip upon the throat and against the head of the nipple.

"and actuated by said piston for compressively clutching the elements upon the nipple"—

That is, they are actuated by movement of piston radially inward to maintain that grip to withhold against the disrupting tendency.

"whereby the pressure of the lubricant on said piston will
70 move the piston to forcibly compress said elements while the lubricant is passing through said connecting parts."

That refers to the operation which I have described in which the lubricant does the actuating, effects the mechanical connection of the coupler to the fitting as the grease is introduced and passes through the system.

Q. I wish now that you would turn to the Alemite hydraulic equipment and with whatever samples or drawings may be convenient, explain that.

A. The Alemite hydraulic system consists of a compressor, a coupler and a fitting as does the Butler.
110 In order to understand this gripping which takes place in this Alemite hydraulic system it might be well to show that that is simply an inversion or a mere reversal of the drawings of Butler. I have here a cylinder and piston assembly, or a piston assembly, I should say, like that of the Butler patent. Here are the segments 40, and by placing this piston assembly of Butler over,
71 that you see that we contract the jaws about the nipple. In the Alemite hydraulic system we place the beveled edge on the cylindrical part instead of on the piston part in and of itself, so that we have here this beveled edge, and if then we set these jaws in that beveled edge as we have here and then the piston up here contracts it operates to squeeze the segments together about the nipple in the same manner I illustrated before.

Now the Alemite hydraulic fitting has the head and the peripheral groove that we see in Butler. The actual dimensions perhaps resemble more the dimensions shown in Fig. 2, or in Figs. 3 and 4, where we see the long conical head and then the rather sharp tapered undercut where the grip is made.

In making this connection between the hydraulic coupler and the fitting, I presume of course this is on the end of a conduit leading to the compressor. We place the coupler over the fitting. Your Honor will see that

the jaws have been urged forward slightly by the spring so that they make an initial grip back of this head. Now then, as the lubricant passes through it enters here through the conduit and comes back of this piston. Now that piston is free to move forwardly slightly and it bears
72 against the ends of these gripping elements which
111 are then forced out or outwardly of the coupler and are urged inwardly by their abutment or by their wedging against an inturned conical section of the shell or cylinder of the coupler, so then as that moves forward the jaws are wedged inwardly to grasp the fitting about the throat and behind the head.

Now, at the same time there is in the Alemite hydraulic system an end seal which is the part I am indicating with my pencil. You may note in passing that it incorporates the Zerk spherical cup there, and that seal is also pushed by the lubricant through these cup leathers or V leathers so the grease forces that down, so that is always being pressed more and more tightly into engagement. The grease is doing the forcing of this sealing element down against the end of the nipple. If you take the fitting off, I think you can see that movement. If this is moved back a spring is now holding it forwardly. You can see the jaws expand. The V leathers which constitute the piston are made with a certain amount of clearance here, so this
73 internal sealing member 51 is free to move with respect to these V leathers and the area of that hole determines the force; that is, taken together with the pressure determines the force at which this sealing element is pushed down against the fitting, so the higher the pressure the tighter the grip and the tighter the seal.

In general, these Alemite hydraulic couplers on these Alemite hydraulic compressors correspond, except in size, with the large aluminum model which I have used here. There are certain minor variations but they are of no importance as to the operation. The operation is the same. Some of them correspond exactly with the aluminum model, except in size. Plaintiff offers in
112 evidence as PLAINTIFF'S EXHIBIT 29 the enlarged aluminum sample of the Butler piston; as PLAINTIFF'S EXHIBIT 30, second one with the slits;
74 as PLAINTIFF'S EXHIBIT 31, the enlarged segmental jaws; as PLAINTIFF'S EXHIBIT 32, the enlarged model of the Alemite hydraulic nipple; and as PLAIN-

TIFF'S EXHIBIT 33, the enlarged aluminum model of the Alemite hydraulic coupler.

I now look at the drawing. It represents accurately one of the commercial embodiments of the Alemite hydraulic equipment as I have described it.

Referring to claim 2 of the Butler patent, I shall mark in pencil on this drawing the reference numerals applicable to the several parts enumerated in said claim 2: "The combination with the headed nipple for receiving lubricant," that is the fitting 35; "of a lubricant compressor having a coupler member for connecting said compressor and nipple", the compressor I will mark No. 1, and the coupler member I will mark generally as C. "Comprising a cylinder, a piston movable within the cylinder," I will mark there the cup leather as 45, the
75 washer there to the right of it as 43, the retaining washer to the left of it as 44, and the nut as 47: "and having an aperture for the discharge of lubricant thereof," that aperture I will mark as 48, and it should be understood that that is the hole opening inside of those V leathers. The sealing member projects through that opening but while, of course, since it has a hole in it, itself, there is a hole through the piston "an apertured sealing seat carried by said piston for engagement with the end of the nipple," that is the sealing element 51 which is the
113 seal at the right-hand end of it. "connecting the piston aperture with a passage through the nipple," of course, that does connect the aperture to the piston with the aperture in the nipple. "—radially movable locking elements carried by the cylinder coacting with the nipple
76 and actuated by said piston for compressively clutching the elements upon the nipple",—those radially moving locking elements are the jaws which I will mark 40. "—whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said elements while the lubricant is passing through said connecting parts."

This Alemite hydraulic equipment as shown in the drawing and in the samples that have been offered in evidence, has in it the combination of elements enumerated in claim 2 of the Butler patent.

The Alemite hydraulic equipment in some forms is different, in minor respects, from the form in which I

77 have already described it. One difference is that in some of the forms instead of using these V leathers, which are relatively expensive, we use a rubber washer which, when the lubricant presses on it expands outwardly and makes a seal both against the outside shell and in against the sealing member. I think that there are perhaps, I don't know how many different forms of that kind of variation in it; there have been several, perhaps three or four. None of those differences affect the presence of the elements of claim 2 in the manner which I have described. There is one other variation which perhaps I ought to mention, and that is, that in some of them that we made for a while last year, we had in addition to this sealing element I have shown, an additional or secondary sealing element, a needle-like nozzle which came down
114 and made a contact with the end of the fitting around the inner periphery of this hole in the fitting, but this seal is a secondary seal, and it meant that there were two seals and if the inner one leaked the outer one would hold, or so we hoped. This Alemite hydraulic coupler
78 marked in evidence as Plaintiff's Exhibit 25, represents this last variation. One may see the needle element. That is an addition to the things I have already described.

I have here a drawing which shows the form of coupler which I have just been speaking about in which there is a needle sealing element in addition to the other sealing
79 element, which I will shade in, in black, and mark "needle nozzle". Also there was added an additional sealing washer at the upper end to make the seal for that needle nozzle and to allow its inward and outward movement.

Plaintiff offers in evidence, as PLAINTIFF'S EXHIBITS 34 and 35, respectively, the first of these two drawings identified and marked by the witness, and the last, showing the additional needle nozzle.

I now take one of these Lincoln fittings sold to Mr. Cornell. As to whether or not that fitting is capable of conjoint use with one of the Alemite hydraulic compressors and couplers of the kind that I have described: This Lincoln Kleenseal fitting differs slightly from the Alemite hydraulic fitting. I notice that it has a round head instead of the dirt cutting edge head; also, that instead of having the spherical undercut or peripheral groove it has a straight groove. That groove, however,

is located in the precisely correct position to make the
80 115 grip or to allow the coupler jaws to grip into that groove. If that groove is moved upward 1/32 of an inch it won't grip; that is, the coupler won't grip; if it is moved downward 3/64 of an inch, again it won't grip. That groove is located just where the jaws come in contact with the fitting if we assume that there were no grooves in it. Now when that fitting is placed in a position to be lubricated, that is, in a bearing, and if then an Alemite hydraulic compressor and coupler are to be used to lubricate the bearing, one operates it and the function and operation are exactly the same as in working on the Alemite hydraulic fitting. You simply pace the coupler over the fitting and start to pump.

Q. Just a moment, before you do that: when you get pressure developed, then would you pick up the gauge with the compressor enough to show the grip there? I don't thing you did show that particularly.

A. (Demonstrating) That we get the grip and with that, of course, I pick up the gauge, except that in this case the angular pull makes it impossible to do it. If this base was kept purely horizontal, of course it would grip.

Q. Let me just hold this down and you pull enough to show its grip.

Mr. Haynes: May I have the record show there was
81 a demonstration made a moment ago by this witness and that he did not pick up the gauge; the gauge fell to the floor?

116 Mr. Williams: Yes, as far as I am concerned, you may.

The Witness: Well, it is possible when this lubricant pressure is achieved here that is when I stop pumping and in this kind of a pump it is achieved when I stop pumping.

The Court: Your position is that there is a pull and that it will hold, that is, at an angle other than a right angle?

A. Well, that is not quite accurate. It can go to some angularity, a certain angularity, about fifteen degrees each side of the center.

The Court: The greater the angularity the greater the ease you have in disconnecting it?

A. You have to get it beyond fifteen degrees when it comes out easily, although I ought to make this point that

just a straight pull, and hard enough with more grease pressure I can't get it off because grease pressure is again making that grip. It will do the same on both fittings.

82 I have here a drawing which represents the Alemite hydraulic compressor and coupler associated with a Lincoln Kleenseal fitting, and you see the jaws in position in the retaining groove on the Lincoln Kleenseal fitting.

117 Applying to that drawing the Butler reference numerals, to the parts of that combination, claim 2 reads on this combination in precisely the same way. It reads upon the association of the Alemite compressor, coupler and Alemite hydraulic fitting. Nothing is changed in this drawing from the other drawing, Exhibit 34, except that we have the Lincoln Kleenseal fitting which I mark with the numeral 35, and put in parentheses, Lincoln. We have the same jaws 40. I will not put in all of these numerals; the piston part, or washer 45, the sealing element 51, compressor 1, the coupler marked generally as C. I will mark the right washer 43 and the left washer 44, and the aperture through the center of the piston as 48.

(Plaintiff offers this drawing in evidence as PLAINTIFF'S EXHIBIT 36.)

83 This drawing shows the same thing as the previous drawing except that it has in it the needle nozzle, which again I will shade in, in black, and mark "needle nozzle". All of the several parts of claim 2 are present in that drawing in the way that I previously described. The coupler parts and the fitting parts are enlarged on the drawing, while the compressor parts are considerably reduced in size.

(Plaintiff offers this last drawing in evidence, as PLAINTIFF'S EXHIBIT 37.)

"Q. You perhaps heard Nelson Cornell testify that when he went to the place of business of the Lincoln Engineering Company he showed them this Alemite hydraulic compressor (referring to Plaintiff's Exhibit 18) and asked for fittings to be used with it."

"Q. Are you familiar with the construction of that particular form of the Alemite hydraulic compressor?

"A. Yes."

84 118 I have here a drawing which fairly and accurately represents the construction of that particular compressor constituting Plaintiff's Exhibit 18. Insofar as the coupler is concerned, as compared with the Alemite hydraulic coupler as I previously explained it; there are no differences, except in the length; this one is a little shorter; the working parts work in the same way. The several parts of claim 2 are present in the combination of a gun, and Alemite hydraulic gun of the kind represented in Plaintiff's Exhibit 18, and the Lincoln Kleenseal fitting as shown in the drawing.

I have put the reference numerals on the several elements.

(Plaintiff offers that drawing in evidence as PLAINTIFF'S EXHIBIT 38.)

85 The operation of this particular Alemite hydraulic compressor, marked Plaintiff's Exhibit 18, in conjunction with the Lincoln Kleenseal fitting is the same in every respect as that which I previously explained and demonstrated.

Looking at other examples of the plaintiff's Alemite hydraulic compressors, for instances the one marked Plaintiff's Exhibit 16, the construction and mode of operation of the coupler mechanism, both in connection with the Alemite hydraulic nipples and in connection with the Lincoln Kleenseal nipples correspond with what I have described.

The same answer is true as to other respects, for instance Plaintiff's Exhibit 17, Plaintiff's Exhibit 19 and this electrically operated sample which is Plaintiff's Exhibit 20.

86 119 I have here a drawing which represents the form of the Alemite hydraulic coupler shown in Plaintiff's Exhibit 19, again, however, with the compressor reduced in size and the coupling part enlarged, all in association and in operative position with the Lincoln Kleenseal fitting. This form of nozzle shows a variation in the cup leather or piston 45, which I have spoken about before, and here we see we have a rubber washer instead of the V leathers; in this the lubricant forcing itself down upon the rubber expands it outwardly to make the seal against the sides and inwardly against the sealing member in the same way as it operates in conjunction with the V leathers,—It

is just a variation of it. In other respects except, perhaps, for variation in proportions of the parts, it is the same as the Alemite hydraulic coupler which I have previously described, and in its method of operation it is precisely the same as the form which I have previously described, I am putting on that drawing the reference letters designating the parts enumerated in claim 2 of the Butler patent.

87 (Plaintiff offers said drawing in evidence as PLAINTIFF'S EXHIBIT 39.)

After this Alemite hydraulic equipment was first introduced in the market, in April 1933, by the fall of that year it was used one hundred per cent by every single car and truck manufacturer with the exception, I think, of Deusenberg and the large Packard, possible one other, perhaps the Nash at that time, which used a so-called centralized system where they pumped the oil or grease from a centrally located pump through tubes to the various bearings; and I think some of those cars had a few of these Alemite hydraulic fittings on them.

88 (No cross examination.)

90 120 DEFENDANTS' PRIMA FACIE PROOF.

ALEXANDER P. FOX, Witness for Defendants:

Direct Examination by Mr. Koenig.

My name is Alexander P. Fox, my age is 43 years; I am a resident of University City, Missouri; I am the

91 vice president and the assistant treasurer of the Lincoln Engineering Company, a Missouri corporation.

"Mr. Haynes: The Lincoln Engineering Company of Missouri, your Honor, is defending this suit and is not a party to the suit."

My technical training has been acquired in the grade and high schools of St. Louis, and at Washington University in St. Louis. My mechanical engineering experience has been secured through my association with the Lincoln Engineering Company during the time that they have been engaged in building lubricating equipment for approximately thirteen years. The Lincoln Steel & Forge

92 Company, which was the name of the company during 1917 and 1918, built mine car trucks of their own design. These trucks were made up of two axles and four wheels and consequently had four journals, and the design of it in the Lincoln truck were anti-friction bearings that is, solid roller or flexible spiral rollers. I started in the employ of the Lincoln Steel & Forge Company as a draftsman, during 1913 when the name of the company was the Barks & Barstow Manufacturing Company. The
121 original company was incorporated in 1910 as the Steel Roof Truss Company. During approximately September 1916 the name of the Barks & Barstow Manu-
93 facturing Company was changed to the Lincoln Steel & Forge Company. My duties in the company had to do with drafting. In about 1924 I was probably in charge of engineering. I have continued in that capacity with that company, or its successor, up to the present time except that since then I have undertaken responsibilities as to matters pertaining to design and I have likewise taken on the matter of shop production. The name of the Lincoln Steel & Forge Company was changed to the present name, Lincoln Engineering Company on February 24, 1931. At the present time my duties pertain to engineering design and production.

"Q. You stated that company made and sold mine
94 car trucks, the predecessor of this company, in 1917 and 1918 sold mine car trucks. Will you explain to the Court some of the problems arising in connection with the lubrication of those trucks?"

"A. As I have mentioned those trucks were built with anti-friction bearings. At that time this type of bearing was quite an improvement in mine car trucks."

These mine car trucks have bearings similar to the bearings on motor cars. They are anti-friction bearings requiring lubrication.

95 123 I have here a drawing marked "Lincoln Steel & Forge Company, St. Louis. Arrangement of lettering on mine car wheels numbered C-17". That is a shop drawing prepared by the Lincoln Steel & Forge Com-
96 pany. The drawing shows the words "Oil here", and indicates an elevated view of a standard pipe plug. The pipe plug had a square projecting head, which was engaged with an ordinary wrench and unscrewed, after

97 which the nozzle of a squirt gun was placed up against the opening in the front of the wheel hub, after which the pipe plug was screwed back into place on the wheel.

(Defendants' counsel conceded that the testimony relative to alleged uses by the Lincoln Engineering Company, or any predecessor about which the witness is now testifying, was for the limited purpose of showing the state of the art and, not being pleaded, was not admissible for the purpose of anticipating the patent in suit.)

The Witness: I have here a drawing marked "Lincoln
98 Steel & Forge Company C-11." This drawing is a shop detail of a mine car truck wheel such as I have referred to, the shop detail showing the front of the wheel hub tapped for a three-quarter inch counter sunk pipe plug. This drawing is dated December 13, 1917.

(Defendants offer in evidence as DEFENDANT'S EXHIBIT A-1, the drawing C-17; and as DEFENDANT'S EXHIBIT A-2, the drawing C-11.)

The lubricating method used on these mine car trucks, that is, the one in which you removed a plug and inserted the nose of a squirt gun, was not entirely satisfactory. Since the bearings were anti-friction bearings it was soon discovered that due to lack of lubrication, they were being damaged, which was attributed to the fact that it took too long to remove this plug to squirt the oil which was too much trouble for the mechanic on the
124 job, and the bearings as a result were neglected.

99 "Mr. Williams: I take it that any patents or publictions or proof of public uses that you cover with your evidence now may be regarded as having been objected to unless they are set up in defendants' answer in so far as showing anticipation or prior knowledge or invention is concerned, and that their receipt in evidence shall be limited to a showing of the state of the art.

"Mr. Haynes: Yes. I assume when you say 'defendants' answer' you mean defendants' amended answer?

"Mr. Williams: Yes, I do. We are agreed about that, are we not?

"Mr. Haynes: Yes."

The Witness: I have here United States Patent 1,520,-688. Fig. 1 of that patent shows an anti-friction bearing housed in a journal box, the box having what is called a spring oiler and a nozzle inserted in the end, or into the

oiler, for the purpose of lubrication. The drawing shows a ball check, I think, indicated by No. 18.

100 (Defendants offer in evidence, as DEFENDANTS' EXHIBIT A-3, patent 1,520,688).

I have here a shop order dated October 21, 1918, No. 625-8, issued to the shop of the Lincoln Steel & Forge Company to produce fifty sets of mine car trucks for the Nokomis Coal Company at Nokomis, Illinois.

(Defendants offer in evidence, as DEFENDANTS' EXHIBIT A 4, this shop order No. 625-8 of the Lincoln Steel & Forge Company).

I have here a bill of material marked "Barks Good-
101 bar Steel Company" dated 10-28-18, which lists several parts of the order we were expected to produce as the result of the instructions in order 625-8. I might account for the caption "Barks Goodbar Steel Company" in that that name happened to be a name that was considered about the time the name was changed to Lincoln Steel & Forge Company, but was not entered into, the bill of material having been printed beforehand. Among other items on this bill of material are listed 200 spring grease plugs, which indicate that lubricators were furnished for this particular lot of mine trucks.

125 I have here a spring oiler which has a slotted skirt and a check valve in it, that is what was referred to at approximately 1918 as a spring oiler. This particular one was produced as I recall by the Watt Mining Car Company and was purchased by the Lincoln Steel & Forge Company from them for application to mine car trucks of the Lincoln Steel & Forge Company. That was furnished under the bill of material for the Nokomis Coal Company.

102 (Defendants offer in evidence as DEFENDANTS' EXHIBIT A-5 the bill of material marked Barks Goodbar Steel Company, dated 10-28-18).

(Defendants offer in evidence as DEFENDANTS' EXHIBIT A-6 the Watt Mine Car Wheel Company's spring oiler).

This spring oiler was adapted to be serviced by the conventional squirt gun, and it was made for the purpose of being contacted with the squirt gun nozzle.

I have here patent 1,578,949 which shows a locking type of grease plug, together with the coupler which ordi-

narily was attached to a grease compressor for lubricating mine car bearings.

As to what the company did in 1920 as to the problem of lubrication, keeping in mind the showing of that patent: The company in 1920 built a grease plug of its own design, designed especially for application to the trucks that the company was building at that time. That
126 oiler I may mention is not this particular oiler but
103 one slightly different, that is, I am speaking of the 1920 design now. It was a long tubular shaped shell with a ball on the inside urged against a seat by means of a compression spring.

(Defendants offer in evidence as DEFENDANTS' EXHIBIT A-7, Barks patent 1,578,949).

I have before me chart 3. The fitting indicated by the date 1920 is the first design of spring oiler or grease fitting that the Lincoln Steel & Forge Company designed for application to their own mine car trucks. The nozzle indicated by the date 1921 is representative of the type of nozzle that was employed at that time to contact the fittings shown as 1920 by the spring oiler for the purpose of lubrication.

I have here a drawing marked Lincoln Steel & Forge Company, spring oiler 8-25-20, No. 1073. This drawing
104 shows the spring oiler depicted at the upper right of chart No. 3. It is the same drawing from which the photostat was prepared.

As to why this type of spring oiler was an improvement over the older type: First of all it saved the operator the necessity of removing the pipe plug. (I am referring now to the pipe plug method), in that the squirt gun went right against the ball check and unseated it and forced the lubricant into the bearings. When that ball check closed, it prevented coal dust and foreign matter from entering that bearing and prevented the lubricant from flowing out. In addition to this the pre-
127 pared edge of the hole against which the nozzle seated was much more uniform than the more or less ragged edge of a hole into which or from which a pipe plug was withdrawn, consequently this seat for the nozzle provided for a more effective seal and consequently it could hold more pressure without leakage.

105 (Defendants offer in evidence as DEFENDANTS' EX-

HIBIT A-8 drawing 1073 marked Lincoln Steel & Forge Company spring oiler).

I have here an invoice of the Keystone Lubricating Company to the Lincoln Steel & Forge Company, dated 1-19-20, which would indicate that the Lincoln Steel & Forge Company purchased a squirt gun from the Keystone Lubricating Company, the purpose of the grease gun being to supply it to a customer to lubricate his mine car trucks which the Lincoln Engineering Company furnished.

I have here a drawing of the Lincoln Steel & Forge Company identified as "Nozzle and cap for grease gun,"
106 dated 8-3-21, No. 1109. This shows a detail of the nozzle for the end of a grease gun for contacting the Lincoln mine car fitting, the nozzle being Lincoln's design of nozzle for that purpose. That nozzle was shown at the upper left in chart No. 3, dated 1921. That nozzle was adapted to enter the spring oiler shown in the drawing 1073.

128 (Defendants offer in evidence as DEFENDANTS' EXHIBIT A-9, said drawing 1109, Lincoln Steel & Forge Company).

(Defendants offer in evidence as DEFENDANTS' EXHIBIT A-10, the invoice from the Keystone Lubricating Company to Lincoln Steel & Forge Company of 1-19-20).

I have here a letter dated July 26, 1921 to Mr. D. D.
107 Dodge of Rosita, Coahuila, Mexico. This particular letter was dictated by me personally under date of July 26, 1921. The first paragraph on the reverse side reads: "We are mailing you today under separate cover a pipe nozzle which we suggest using in connection with your grease gun. This nozzle is long enough to prevent the barrel of the gun coming in contact with the spokes, and it will also form a tight seal with your spring oiler." The gun referred to in that letter was like the gun shown on drawing 1109. The design of the nozzle was as shown on drawing 1109, as shown on the upper left of chart No. 3.

108 (Defendants offer in evidence as DEFENDANTS' EXHIBIT A-11, said letter of July 26th).

As to drawing 1109, Defendants' Exhibit 9, which shows a cap on the rear: That detail represents the front end of a complete grease gun. The threaded large end

here was provided to screw onto a tube of that size which would serve as a reservoir for the oil or lubricant. We did not furnish tubes to thread into the cap on the end of the nozzle of drawing 1109. As a matter of
109 129 fact, to my recollection that particular part in just the lines there was never produced, in that we used instead ordinary pipe caps and tapped them out for the pipe nozzle. The requirements we had for nozzles or guns at the time did not justify the expense of dies to produce that particular form. But this drawing illustrates the form that we were selling as far as the nozzle is concerned. That nozzle was on a so-called squirt gun.

113 130 Proceedings of April 15, 1936.

(Plaintiff offers in evidence, as PLAINTIFF'S EXHIBIT 40, a cross-sectional sample of the Butler coupler that was referred to by Mr. Williams in his testimony.)

114 "Mr. Haynes: The drawing entitled, 'Oiling Diagram for Mine Cars' has a built-in lubricant fitting. It shows the spring oiler built in the journal box; it also shows a compressor with the nozzle adapted to be inserted in the opening of the built-in lubricating fitting. The drawing was made for the purpose of indicating the manner in which the squirt gun of about one pound capacity was inserted in the opening of the built-in spring oiler."

115 The Witness: The gun shown on that drawing just
116 mentioned was of the type descriptive of what Keystone sold at about the time of this drawing, in 1920.

(Defendants offer said drawing in evidence as DEFENDANTS' EXHIBIT A-12.)

That type of gun was in use more or less in all coal mines about 1920. In some instances we furnished the gun, and in other instances Keystone furnished the guns, and in other instances the mines bought the guns direct themselves and we furnished the nozzles only.

I have here a drawing dated January 17, 1920 which shows the details of the same journal box which was shown in Exhibit A-12.

(Defendants offer in evidence as DEFENDANTS' EXHIBIT A-13, said drawing dated January 17, 1920.

117 131 As to the relationship between drawings Defendants' Exhibits A-12 and A-13: The drawing before me (Defendants' Exhibit A-13) is a dimensional draw-

ing showing proportions of the mine car truck. The previous drawing (Defendants' Exhibit A-12) was prepared as an instruction drawing to indicate the manner in which lubrication was to be undertaken.

Exhibit A-12 is undated. In the light of my experience at my Company's office, I would say, from the structural member shown in each drawing (Defendants' Exhibits A-12 and A-13) that they represent the same type of truck and consequently the drawings were prepared at approximately the same time.

The compressor shown in Exhibit A-12 is one of the conventional type which was available in 1920. We re-
118 sold the grease guns which we purchased from Keystone around that time.

I have a letter of inquiry from the Standard Oil Company of Indiana, under date of January 21, 1921, requesting that the Lincoln Steel and Forge Company quote on four grease guns for mine car wheels.

I have a carbon copy of a letter by the Lincoln Steel and Forge Company to Standard Oil Company of Indiana, dated February 1, 1921, which is the quotation to the Standard Oil Company of Indiana in reply to their inquiry of January 21st, listing among other things, four grease guns.

I have an order from the Standard Oil Company of
119 Indiana for four grease guns in accordance with the Lincoln Steel and Forge Company's proposal of February 1, 1921.

I have correspondence here from Lincoln Steel and Forge Company, July 24, 1920, to Standard Oil Company, Carlinville, Illinois, and to Allen & Garcia Company of Chicago, dated September 9, 1920, and to United States Fuel Company of Benton, Illinois, dated August 20, 1921, indicating that this greasing system was available
132 and how it functioned. As to the kind of grease recommended at that time: a letter of August 20,
120 1921 suggests Superla No. 39 or Keystone No. 19 extra heavy grease. Nozzles such as are shown in Defendants' Exhibit A-9 were used by my company on spring oilers such as are shown in drawing 1073, Exhibit A-8, and shown on the chart 3. The nozzle shown on the drawing No. 1109, was furnished to us in connection with the plug shown on our drawing marked 1073. The nozzle on chart 3 is shown at the top to the left, right close to the date

1921; the spring oiler is shown to the right of it close to the date 1920.

A shop order of Lincoln Steel and Forge Company, dated March 8, 1921, to Oliphant-Johnson Coal Company, Bruceville, Indiana lists among other things, a nozzle for a grease gun and has a notation, instructions for applying to be sent with the invoice. That was a nozzle for a grease gun, the nozzle being similar to the drawing at the upper left on chart No. 3.

121 A letter from Lincoln Steel and Forge Company to Pocahontas Mining Company, St. Louis, Missouri, November 15, 1922 states that the Lincoln Steel and Forge Company was equipping a cabinet, which means a grease pump with a standard nozzle for all self-closing spring oilers and sending along an extra interchangeable taper nozzle to enable the cabinet to be used in greasing other equipment in the mine. The operation of the taper nozzle compressor outlets when used with the spring oilers was satisfactory. We made improvements in your lubricating systems about 1922. These were for applying lubricant and particularly semi-solid greases to the 133 truck journals. In 1922 a hand cabinet, as we call it,
122 was provided which held ten pounds of grease, in the case of the squirt gun, and held twenty-five pounds of grease. It was equipped with a four foot hose and a barrel-shaped tapered nozzle on the end of the hose. The pumping mechanism was vertical within the twenty-five pound can. The application of the grease was done by holding the tapered nozzle in the opening of the mine car wheel and pumping up and down with a handle.

The photograph (Defendants' Exhibit A-14) of about 1922 shows the construction of the twenty-five pound hand cabinet which I have been describing. However, the nozzle extension on the hose is different from the tapered nozzle that I have described. This is due to the fact
123 that during 1922 we changed the design of the spring oiler, instead of having the spring pressed check which the nozzle bore against, we provided a design of spring oiler that had projecting lugs to attach the coupler in the form of a breach lock. That type of coupler is shown on this photograph.

(Defendants offer said photograph in evidence as DEFENDANTS' EXHIBIT A-14.)

Invoice No. 8822 of Runyen Manufacturing Company, Grand Rapids, Michigan, dated September 9, 1922 is for twelve of the grease cabinets to which I have just been referring. Other correspondence between Lincoln Steel and Forge Company and this Runyen Manufacturing Company, dated in 1922 relates to this same transaction.
124 Lincoln purchased those cabinets from Runyen at that time. These cabinets were received and resold at approximately the date of the invoice, September 9, 1922.

134 Order No. 3809, from Union Colliery Company, St. Louis, Missouri, to Lincoln Steel and Forge Company under date of December 6, 1922 relates to one Lincoln grease cabinet with connections of the type that I have just been describing. There were frequent trans-
125 actions of this kind. With this type of compressor it was not convenient for the operator to hold the push type of seal. The barrel shaped tapered nozzle was used to better advantage on squirt guns where the manual effort in discharging the contents of the gun likewise held the end of the nozzle in the hole of the mine car wheel. In the case of the hand cabinet the operator's effort was in a vertical position with one hand, and consequently he had to use his other hand to hold the nozzle against its seat.

It is more convenient to use this type of pump shown in this photograph with a coupling that is attached in a semi-permanent fashion to the spring oiler. Drawing
126 dated March 31, 1922, drawing HB-216 of Lincoln Steel and Forge Company was the next lubricating device designed by our company. It shows the design of a spring oiler having lugs projecting from the outside under which ears on the coupler engaged in order to hold the coupler fixed with the oiler while the twenty-five pound hand cabinet is operated. It was the custom of our company to affix to a drawing a date. The date shown of March 31, 1922 would indicate the time at which this particular type of spring oiler and coupler was put in use. It was our company's custom throughout my connection with the company, to apply on a drawing a date showing the date of completion of the drawing.

(Defendants offer drawing HB-216 in evidence as DEFENDANTS' EXHIBIT A-15.)

127 135 Here is a spring oiler that was constructed in accordance with the details of the drawing, referring to Exhibit A-15.

(Defendants offer this oiler in evidence as DEFENDANTS' EXHIBIT A-16.)

We received orders at that time for a substantial quantity of fittings such as this Exhibit A-16 oiler. The quantity of that particular type was confined to our own mine car trucks, and was put on all trucks as a standard oiler. Order No. 31319 of Pratt Consolidated Coal Company, Birmingham, Alabama, dated October 24, 1922, to Lincoln Steel and Forge Company, and some attached correspondence is an order from the Pratt Consolidated
128 Coal Company listing ten housings for roller bearings for Lincoln wheels. The attached correspondence is the Lincoln Steel and Forge Company's shop order against which the customer's order was filled, and there is a bill of material as part of the shop order which lists more coupler oilers. There is likewise an order from the Saxton Coal Company, Terre Haute, Indiana, dated August
129 16, 1923, listing six spring oilers. The order was received and approved and left the shipping department. The date of leaving the shipping department appears to be August 17, 1923.

The next event in the history of this oiler, Exhibit A-16 is identified by a Lincoln Steel & Forge Company drawing of October 2, 1924 numbered G350-2. That is a detail showing the shell of the spring oiler having a one-eighth inch pipe thread. At about the date of this drawing, which is 1924, the Lincoln system,—the Lincoln method of lubricating mine cars has received some recognition, to the extent that requests were received from mines and builders of coal truck equipment for several oilers and couplers and compressors sufficient for lubricating their equipment, consequently the Lincoln Steel & Forge Company designed a range of these oilers
136 having different thread sizes such as ⅜ pipe and ½ inch standard straight pipe thread and this is an old design for part of the full range of thread sizes.

(Defendants offer said drawing G350-2 in evidence as DEFENDANTS' EXHIBIT A-17.)

130 Drawing of the Lincoln Steel & Forge Company dated April 22, 1924, No. HB297 shows details for the breech lock type of coupler, having certain modifications over

the design previously shown, and it was developed in connection with the range of different thread size spring oilers for competitive equipment. It likewise shows a nozzle having a taper on the end which is designed to snap into the end of the lock of the breech lock cupler, leaving the tapered nozzle exposed for contacting bearings that were not equipped with a breech lock type of spring oiler bearing, for instance, they have only pipe lugs. When the pipe lug was taken out the tapered nozzle would fit the hole.

(Defendants offer said drawing HB-297 in evidence as DEFENDANTS' EXHIBIT A-18.)

Here is a coupler built in accordance with the design of drawing of Defendants' Exhibit A-18, having the in-
131 ternal projecting ears which lock under corresponding ears projecting outwardly on the spring oiler. A seal was formed by the wedging action of the jaws on the sides there, slightly tapered.

(Defendants offer the specimen just identified by the witness in evidence as DEFENDANTS' EXHIBIT A-19.)

Further improvements in this design of coupler and fitting just referred to were made in 1924. The improvements at that time consisted of completing the full range of thread sizes and building a complete lubricating system which was sold commercially.

132 137 The exhibits A-15, A-18 and A-17 which you hand me show the breech lock coupler and fitting, the original designs of 1922 and the improved designs of 1924. Now, then during 1924 it was found that the 25-pound hand cabinet that was used in connection with this coupler system was not adequate and consequently the Lincoln Steel & Forge Company designed an automatic power operated compressor.

I have here one of the breech lock type of spring oilers that were sold about 1924. It is an improvement over the 1922 design and carries modifications over the 1922 design.

(Defendants offer the 1924 type of spring oilers in evidence as DEFENDANTS' EXHIBIT A-20.)

133 Exhibit A-20 was directed to the problem of injecting a lubricant into a mine car truck bearing. Drawing HB-314 of Lincoln Steel & Forge Company dated April 19, 1924 is an assembly drawing of the power driven grease

compressor which the Lincoln Steel & Forge Company designed and built during 1924. The structure is made up of two 400-pound containers, having grease on the bottom side and air on the top side. The grease is forced out from the bottom into a booster pump that is represented in the plan view. From the booster pump, which increased the pressure over the pressure existing in the pressure container, the grease was carried out a delivery line, which is not indicated on this drawing, through a 15-foot delivery hose and through a control valve on the end of the hose, and then through the breech lock type of
134 Lincoln coupler which was connected to a spring oiler. The operation of the machine was in this fashion. The operator merely connected the breech lock coupler to the fitting and opened the control valve. Instantly and automatically the booster pump started in operation delivering grease to the bearing at a pressure in excess of the air line pressure, probably a two and one-half to three to one ratio. The automatic action was brought about by an automatic valve, which was attached to the side
138 of the booster pump. That is shown clearly on the drawing at this point in the form of a cross.

(Defendants offer the drawing HB-314 in evidence as DEFENDANTS' EXHIBIT A-21.)

Defendants' Exhibit A-22 is a photograph of the design shown in HB-314. It shows, in addition to what is shown on the drawing, the 15-foot delivery hose with a shut-off valve, and the extension having the breech lock coupler, and it shows the automatic valve attached to the booster pump and connections from the booster pump to the
135 bottom of the lubricant tanks. This particular photograph is undated, but from my own recollection I am quite sure it was during the year of 1924.

(Defendants offer said photograph in evidenec as DEFENDANTS' EXHIBIT A-22.)

Defendant's Exhibit A-23 shows the range of the breech lock type fitting unit and the coupler member with the control valve and a handle such as was used on the power operated compressor.

(Defendants offer this photograph in evidence as DEFENDANTS' EXHIBIT A-23.)

Defendants' Exhibit A-24 shows the same power driven compressor that has been referred to in action operation with an operator on each side of the track on which there

is a string of mine car trucks. Each operator connects the spring oiler as the truck comes by and opens the con-
136 trol valves, permitting the automatic grease compressor to pump the lubricant into the bearings. That photograph was made during 1924.

(Defendants offer the photograph last identified in evidence as DEFENDANTS' EXHIBIT A-24.)

139 The apparatus of these photographs, Exhibits A-22 and A-24 was made in smaller sizes. The photograph A-24 shows a unit built with two 400-pound pressure containers. There was likewise a small unit built at the same time having only one 400-pound pressure container. One photograph of Defendants' Exhibit A-25 shows the single-container unit to which I have just referred. This photograph was made in 1924.

(Defendants offer the photograph last identified in evi-
137 dence as DEFENDANTS' EXHIBIT A-25.)

138 I have already described the operation to some extent of Defendants' Exhibits A-22 and A-21, indicating that the compressor was automatic. All that was required was to put the grease in the tank and attach the air, and to operate it all that was required by the operator was
139 to open the air valve on the end of the 15-foot hose.

The company's business of making and selling compressor couplers and fittings for mine cars was carried on continuously from 1922 to the present time. A catalog of Lincoln Steel & Forge Company, St. Louis, entitled "Lincoln Journal Box Trucks" describes the type of mine car truck that the Lincoln Steel & Forge Company sold during 1924. It shows the breech lock type of plug oiler and a coupler in position on the oiler attached to a journal box. Drawing G-1397 March 26, 1930 is a further design of spring oiler or grease cup developed later by the Lincoln Steel & Forge Company. The original of that design was produced during 1926, and this design differs from the breech lock in that it shows as a countersunk base and does not have the projecting ears.

140 (Defendants offer the drawing dated March 26, 1930 in evidence as DEFENDANTS' EXHIBIT A-26.)

Although the original design of this type of plug oiler was produced during 1926, that drawing was of 1930.
140 That particular type was not produced I don't think until about 1930, that is; that construction, that manner of making it. Drawing G-1084 of the Lincoln Steel

& Forge Company dated July 3, 1929 is a detail of a range of grease plugs having different thread sizes. The plugs are not the breach lock design, they do not have projecting ears for connecting onto. Instead, they have a counter sunk base to be contracted with a nozzle.

(Defendants offer said drawing in evidence as DE-
141 FENDANTS' EXHIBIT A-27.)

Drawing G-350-N2 dated September 3, 1927 shows the detail of a nozzle for an automatic or a manually operated grease compressor for contacting Lincoln grease plugs having a counter sunk base such as the last two drawings that were handed me. However, this last drawing G-350-N2 carries a date of 1927. The counter sunk base grease plug with which this cooperates was produced in 1926.

(Defendants offer in evidence the drawing just identified as DEFENDANTS' EXHIBIT A-28.)

Drawing, Exhibit A-28, is shown on chart 3 on the second from the top on the left hand side next to the date 1927 and bearing the date 1927. I have here a noz-
142 zle for contacting a Lincoln grease plug made along the lines and in accordance with the drawing G-350-N2 made since 1927. It has been made since then right along.

(Defendants offer said specimen in evidence as DEFENDANTS' EXHIBIT A-29.)

Drawing of the Lincoln Steel & Forge Company dated September 6, 1927 shows a detail of the type of spring oiler with which the barrel-shaped tapered nozzle, as shown on chart 3 close to the date 1927, was to contact with. My reference is to the nozzle on the left hand side of the middle of chart 3. That shows the nozzle which the grease plug on the drawing dated 9-6-27 was to
143 141 contact. The drawing dated 9-6-27 is at the right middle part of chart 3 close to the date 1927.

(Defendants offer the drawing just identified in evidence as DEFENDANTS' EXHIBIT A-30.)

Drawing bearing in the lower left hand corner the legend "Fox 11-20-25" shows another type of automatic power operated grease compressor that was designed by the Lincoln Steel & Forge Company during 1925. It represents a reduced model of A-22 in that the grease is still fed from the bottom of the tank into a pumping unit. The pumping unit is a booster pump which increases the pressure over the air pressure used. The air pressure

in this case is in an air cylinder and is not put on the top of the tank inasmuch as the grease in this case would flow by gravity to the pump cylinder. The automatic valve which actuates the machine, as shown in the photograph A-22, is likewise presented here on this smaller
144 machine. This design was developed for automotive lubrication, whereas the larger model drawing, A-22, was designed for mine car lubrication. That accounts for the reduced proportions. It was required to be portable, only 25 pounds of lubricant were required instead of 400, and the pressure at which the grease was delivered automatically from the pump was approximately 2,000 pounds per square inch, whereas in the case of the larger model it probably would not exceed 400 pounds per square inch. Both types were operated automatically at a point remote from the pumping unit by a control valve at the end of a hose. In either case all that was required of the operator was simply to manipulate the control valve and the compressor pumped grease automatically.

(Defendants offer the drawing just identified in evidence as DEFENDANTS' EXHIBIT A-31.)

142 The principles of operation for mine car lubrication and for lubrication of automotive vehicles were the same except for the magnitude of the pressure. The same type of bearings were used in the two styles of equipment and the same type of lubricant was as a rule used at that time for lubrication. This drawing, Exhibit
145 A-31, was made from a machine then actually in existence. The pump and the compressor shown by this drawing was in existence at the time the drawing was made.

Lincoln Steel & Forge Company shop order S-1393, dated March 1, 1925 relates to grease compressors or pumps of the type shown on this drawing dated November 20, 1925 referring to Exhibit A-31. At the time we built that machine our company had no contact with anyone at the Alemite or Bassick Companies. The machine was built approximately during March 1925.

The next problem was to secure a sales outlet, and we had designed the machine for automotive lubrication and we, of course, knew of the types of pin-fittings that were on the market on automobiles at that time and which led
146 to negotiations with the Bassick Manufacturing Company for the sale of the pump. Bassick Manufacturing Company catalog dated as having been issued in April 1925

shows only manually operated grease guns, principally of the small hand gun type. Negotiations were carried on with the then Bassick Manufacturing Company, which resulted in the Bassick Manufacturing Company taking on the sale of the small automatic compressor which I have been discussing. During the negotiations with the Bassick manufacturing Company it was necessary to demonstrate the compressor to them, and for that purpose I personally conducted a test at the Bassick Company's plant in Chicago for a period of one week. A letter from Alemite Lubricator Company of St. Louis to Bassick Manufacturing Company, Chicago, dated June 11,
147 143 1925 assists me in fixing the date that I made those tests. The date of the letter is June 11, 1925 and refers to the tests. The date of the tests is approximately that same time. The Bassick Manufacturing Company undertook the exclusive sale of the automatic grease compressor which we submitted to them. A purchase order by the Bassick Manufacturing Company, Chicago, to Lincoln Steel & Forge Company, December 9, 1925 is the first order received from the Bassick Manufacturing Company for a lot of 280 compressors similar to the drawing that bears the date, as I recall, of November the 20th, 1925, Defendant Exhibit A-31. Referring to the letter
148 of June 11th to J. E. Otis of the Bassick Manufacturing Company, signed by Frier of the Alemite Lubricator Company of St. Louis, I do not know anything about that of my own knowledge. I did not write it or receive it. I account for the name "Frier" in that Mr. Frier at that time was the St. Louis distributor for Alemite. I knew about the letter probably only through our contact with Mr. Frier.

The publication entitled "Price List, Alemite and Ale-
149 mite-Zerk Equipment and Parts" bearing the legend "Issued July 1926" at page 11 shows a parts drawing of the automatic compressor as shown on the drawing dated 11-20-25, Defendant Exhibit A-31.

Mr. Williams: Is the point of this now that we have bought these things from Mr. Fox' company? I will admit we bought thousands and thousands of them for many years, if that is what you are trying to prove. We bought them then and continued for years to buy them. There is no doubt about it.

(Noon recess.)

150 144 Our company's lubrication apparatus is marketed under our company's own trade marks. The trade mark Registration 215210, dated July 13, 1926, trade mark "Airline", and Registration 231,354, dated August 16, 1927, trade mark "Lubrigun" are two registrations owned by our company.

151 The drawing dated December 22, 1932 is the nozzle end of a high pressure nozzle for contacting the inside hole of a high pressure grease fitting. The small tubular member in the center merely contacts the inside edge of the hole to hold a seal. That drawing was made as indicated on the drawing, December 22, 1932. That is one of our company drawings signed by L. C. Rotter, a draftsman in the employ of our company. It represents the 152 contact needle. We have made this in the past. It is an obsolete type at the moment. We started making it at approximately the date of that drawing.

Describing briefly the operation of this device shown in the drawing, the needle, which is the center tubular member with a bevel on the edge, forms the front end of a high pressure nozzle. The curved entrance here serves as a guide to guide the nozzle onto the fitting and center this needle against the center hole, so that all that is required is the normal effort of an operator to hold the nozzle against a high pressure fitting to maintain a seal of up to five, six, or eight to ten thousand pounds per square inch of pressure.

(Defendants offer said drawing in evidence as DEFENDANTS' EXHIBIT A-32.)

Drawing marked Plate 236, and bearing the date of January 6, 1933 is a detail of the complete nozzle, having 153 the same type of needle and the same sort of guiding flange at the front end, and having provision on the rear end for screwing onto a pipe thread, which is the common thread on the outside of grease compressors. That is one of our company drawings. It was made at approximately the date which it bears, January 6, 1933. Our company sold a few devices made according to that drawing, 145 starting approximately at the time of the drawing.

(Defendants offer said drawing in evidence as DEFENDANTS' EXHIBIT A-33.)

We called our product made according to this drawing (Defendant's Exhibit A-33) the N-1 nozzle.

I am the Mr. Fox named in a patent issued to Alex-

ander P. Fox, *et al.*, No. 1,959,529, dated May 22, 1934,
154 application filed January 12, 1933. The patent is owned by our company and shows the same nozzle structure and is somewhat more complete in showing or including a high pressure fitting at the approximate entrance to the base of the nozzle, and likewise a high pressure fitting centered within the nozzle and in a position to hold a grease seal.

(Defendants offer said patent in evidence as DEFENDANTS' EXHIBIT A-34.)

(Chart 23 is marked for identification. It is a photostat except that the figures have been re-arranged to get them in more readable relative order.)

The drawing marked Lincoln Engineering Company Plate 236-A, dated January 23, 1933 shows, to all pur-
155 poses, the same nozzle structure with a slight modification in the packing member and the manner in which it is housed. Some difficulty was encountered in the original design as shown, for instance, at Fig. 2. The needle is numbered 4, and it has a little flared end which rests against the packing at the upper end of the needle. Now, that flared end was exposed to pressure from the back side as the flow of the lubricant under pressure followed, starting at the numeral Fig. 2 and down in that direction through the fitting. Some difficulty was encountered in that the needle would blow through the packing due to the high pressures, which accounted for the change which this drawing shows, referring to drawing number 236-A,
wherein the metal washer was placed behind the
146 packing to take the bearing of the flared inner end of the needle. That prevented the needle from blowing through the nozzle due to pressure. Drawing 236-A
156 was made January 23, 1933. We were marketing that nozzle, I would say, at approximately that date, within a week or two.

(Defendants offer said drawing 236-A in evidence as DEFENDANTS' EXHIBIT A-35.)

Drawing of Lincoln Engineering Company, Plate 306, bearing the date March 29, 1933 shows a sectional view of a further improvement in the needle design of a high pressure nozzle, for the same purpose. In this structure the parts are, for all purposes, the same as Chart 23, with the exception of the design of the needle and the guide cap. I might explain that this design of needle shown on Chart 23 has a taper at the end that is approximately 45

degrees. That is indicated by the numeral 32 in Fig. 2. In the original design that degree of taper was resorted to for fear that a long, slender needle of a nozzle of the general design shown on the left-hand, upper drawing
157 of Chart 3, if used to enter the hole of a high pressure fitting, which would be very small, would not be a practical commercial design. In other words, it would be so small and so flimsy that when it was held in the hole of the fitting and the slightest movement sidewise was resorted to it would break the long, tapered needle. It would have to be so thin walled it would snap off. Consequently the 45 degree angle was originally put on the end of the needle, under the theory that it would permit of the needle rolling out of the hole of the fitting without damage. Now then, tests and experimenting that were conducted during, well, I should say the end of 1932 and the early part of 1933, demonstrated that we could design—we could manufacture a rather long, tapered nozzle that would enter in the hole of a high pressure fitting and which would hold a seal with normal effort at about ten thousand pounds, and which would not become damaged or broken if put in or through the regular
147 commercial channels.

158 That type of needle, or the needle of that type was developed, and which is shown on this drawing, Plate 306, is probably shown to better advantage on Chart 3, the lower left hand drawing, close to the date "1933." In that design the packing member was behind a flange on the needle and a tubular portion of the needle entered the center of the packing, which has very effectively prevented any leakage. Now, that would account for this design of needle.

(Defendants offer said drawing just referred to, in evidence as DEFENDANTS' EXHIBIT A-36.)

Lincoln Engineering Company drawing, A-10503 is a duplicate of the illustration in the lower left corner of Chart 3. This drawing A-10503 is a shop detail to which the part is prepared.

(Defendants offer said drawing A-10503 in evidence as DEFENDANTS' EXHIBIT A-37.)

159 Defendants' Exhibit A-29 relates to this type of apparatus. Exhibit A-29 shows the same general contour that was followed in the design of the needle as shown on Chart 3, close to the date "1933," the obvious difference

being that the chart, or the needle per chart Number 3 is to smaller proportions. The same bulged or barrel shaped taper is followed out with both needles. Exhibit A-29 specimen appears on Chart 3 in the middle drawing on the left, close to the date "1927."

Linder's Patent 1,947,208, granted February 13, 1934, application filed April 20, 1933 is owned by our company. It shows the same design of high pressure needle as illustrated in the drawing Exhibit A-37.

(Defendants offer in evidence patent 1,947,208 as DEFENDANTS' EXHIBIT A-38.)

148 A photostatic enlargement of this patent is identified as Chart 4.

The catalog of Lincoln Engineering Company, entitled "Lincoln Lubricating Equipment" covered by printing
161 company invoice dated March 31, 1933, was published about March, 1933. That catalog shows the N-1 nozzle on the inside of the first page. There is no high pressure grease fitting shown in the catalog. The lower picture shows the nozzle in contact with the fitting, but the fitting isn't clear. Our company was manufacturing and selling apparatus of the kind shown in this catalog at the date of March 1933.

(Defendants offer the catalog in evidence as DEFENDANTS' EXHIBIT A-39.)

Referring to catalog A-39, the N-1 nozzles therein
162 shown were intended to co-operate with high pressure fittings of the design shown on Chart 4, which were referred to commercially as Zerk fittings. Zerk fittings were in general use in the United States at that time. Referring to Plaintiff's Exhibit 12, that is the Zerk fitting to which I have just referred.

I have here Lincoln N-1 nozzles of the type shown in Defendants' Exhibit A-36. The high pressure needle as shown in the drawing is in this specimen. The specimen is the nozzle shown on the inside front cover of this catalog, Defendants' Exhibit A-39, in so far as its purpose and use is concerned. However, the nozzle from which the cut in the catalog was made may have had a design of needle similar to Chart 23 on the inside of it.

(Defendants offer in evidence the nozzle just identified as DEFENDANTS' EXHIBIT A-40.)

163 149 Our company actively pushed the sale of nozzles such as Defendants' Exhibit A-40, beginning at approximately January, 1933.

Lincoln Enginering Company inter-office memorandum addressed to "All distributors," and dated July 18, 1933, and marked as "Sales Bulletin S-5" is one of the documents of our company. It was issued on or approximately July 18, 1933 to our sales distributors.

164 (Defendants offer said bulletin in evidence as DEFENDANTS' EXHIBIT A-41.)

166 I have had actual experience in using push type nozzles
167 attached to our compressors on high pressure push type fittings and have observed and studied repeated operations of such apparatus. I would say that I have done that since 1925. Purchasers had trouble in using our high
168 pressure compressing apparatus with push type Zerk
169 couplers on push type Zerk fittings. In test and operations which I have studied and observed of our pressure compressing apparatus when used with the Zerk push type coupler on the Zerk push type fittings, I have observed difficulties encountered. The compressors would develop considerably more pressure than the Zerk nozzle would seal against the Zerk fitting when held with a normal effort. I know of my own knowledge that such high pressures are encountered in the actual lubrication of automobiles in shackle bearings that become frozen, which is the customary term to indicate a bearing that is blocked with soot, dirt or grit. In an effort to solve that problem we developed the use of the inside contact nozzle similar to that which we applied on the lubrication of mine car trucks. We applied that same inside contact nozzle to the
170 hole in high pressure fittings by merely reducing
150 the proportions of it. That was done during 1932.

I am personally and intimately familiar with our company's endeavors to solve that problem in 1932. I designed, for example, the type of inside contact needle shown in the patent as per chart 23. That construction guided the nozzle in the same manner that we had guided it some years before in the lubrication of mine cars.

171 The patent issued to Frank S. Barks, Alexander P. Fox and William Z. Linders, assignors to Lincoln Engineering Company, No. 2,010,174, granted August 6, 1935 on an application filed October 13, 1934, is a patent owned by our company and relates to the construction that I have just been describing. It shows the same design of high pressure needle for contacting the hole of the high pressure fitting. So far as the needle is concerned, that

patent illustrates apparatus which our company manufactured and sold as early as 1932. My company did not make and sell the high pressure fitting shown here as early as 1932.

Defendants offer the patent copy in evidence as DEFENDANTS' EXHIBIT A-42.)

A shipping memorandum of Lincoln Engineering Company No. 8816, dated January 28, 1933 for one N-1 Lin-
172 coln nozzle is just one kind of N-1 nozzle with two types of high pressure needles, that are shown on chart 23 indicated by the numeral 4 in Fig. 2, and that shown on chart 4 indicated by the numeral 47. I cannot be entirely sure which type is shown in the shipping memorandum No. 8816, in as much as this invoice represents on of the very first nozzles shipped, and there were just a limited number of the needles such as chart 23, No. 4 in Fig. 2 that were shipped out. We shipped an N-1 nozzle of one or the other of these two kinds on January, 1933. I
173 have a record of how many N-1 noozles our company
174 sold in the year 1933. In the year of 1933 there were 6,815 sold. The dollar value of the complete units, compressors and nozzles, totals $60,769.09. Our com-
151 pany's sale of these 6,815 N-1 nozzles began during January 1933 and continued throughout each month of that year. Some of those were for hand operated guns
175 and some were for power guns.

(The witness was asked to state the quantity of N-1 nozzles sold by the Lincoln Engineering Company during 1934. Plaintiff's counsel objected on the ground of irrelevancy. The objection was overruled and an exception noted to plaintiff. The witness was permitted to answer, and he stated that the quantity sold was 15,207. The witness was aked to give the money value of the N-1 nozzles sold by the Lincoln Engineering Company during 1934. Plaintiff's counsel objected on the ground of irrelevancy. The objection was overruled and an exception noted to plaintiff. The witness was permitted to answer, and he stated that the money value was $264,104.79.)

The Witness: For the year 1935 up to the month of
176 September, the number of N-1 nozzles sold is 40,242; the total money value is $324,000.00. The N-1 nozzle through all this testimony means the same thing with one or the other of these two small variations in the shape of the needle. Plaintiff's Exhibit 14, which has been described

as commercial Alemite hydraulic fittings was not the first so-called Alemite hydraulic fitting that came on the market, so far as I know. I saw a form of Alemite hydraulic fitting prior to the time I first say the form of Alemite hydraulic fitting, Plaintiff's Exhibit 14.

177 Referring to the Lincoln nozzle type N-6, our company started selling this approximately November 1934 and
178 has been selling that type of nozzle continuously since that time for use with the Lincoln Kleenseal high pressure fitting of the kind shown in Plaintiff's Exhibit 27. The N-6 coupler is provided with a cap that incorporates a guiding flange indicated on chart 5 Fig. 1, indicated by the figure I should say 79. The purpose of that guide flange is to center the nozzle over the head of the fitting so that the high pressure needle centers within the hole of the fitting quickly. The needle cannot be held on a straight line in the normal operation of the nozzle, and in holding pressure, some slight movement from a straight line takes place with respect to the nozzle and the fitting to permit the nozzle to angle; to compensate for that movement a groove is cut around the periphery of the fitting to provide a clearance for the guiding flange.

180 152 I have here parts of an auxiliary nozzle cap
181 shown on chart No. 5 in Fig. 3. The outer sleeve carries the numeral 85 I should say, and inner member the numeral 91. It was made by our company. Our company manufactures that auxiliary nozzle cap. The cap proper has a bore to accommodate a friction grip which is a tubular slip member. The purpose of the nozzle is to permit of putting the nozzle permanently onto a fitting and having it remain there, and it is accomplished by having this friction grip forced all the way down over the diameter of the fitting. It fits tight, consequently I can't do it as readily here. The friction member is forced down
182 to the hex portion of the fitting. In that way the nozzle needle is engaged with the hole in the fitting. This friction member is fitted to the inside of the cap. The cap turns on the end of the nozzle. The high pressure needle is within the nozzle. The application consists of merely pressing that nozzle over the diameter of the fitting for the purpose of exactly centering the nozzle on the fitting and providing a frictional grip contact so that the nozzle will stay put on the fitting. It is required and designed primarily for a man who lubricates his own car and has

no advantage of a lift and has to crawl on the ground and pushes the gun on the fitting with one hand, then is able to change his position and operate it again, then withdraw the gun from the fitting. It is not the nozzle that would be used for instance in connection with service station compressors where there is any volume of lubrication
183 to be done. These specimens are usually referred to as the snap-on type nozzle.

153 (Defendants offer the snap-on type specimens just identified, in evidence as DEFENDANTS' EXHIBIT A-43.)

In the use of nozzles of that A-43 snap-on type the pressure in the nozzle does not hold the nozzle onto the fitting. Manual effort holds it on. This Exhibit A-43 nozzle is removed from the fitting by simply withdrawing it with enough effort to overcome the frictional grip. That is the construction shown in Fig. 3 of chart 5. These fittings shown in Plaintiff's Exhibit 27 were designed for use with the snap-on nozzles, Exhibit A-43.

184 (Defendants offer in evidence as DEFENDANTS' EXHIBIT A-44 the N-6 Lincoln Kleenseal nozzle.)

I know the type of fittings for which this N-6 nozzle, Exhibit A-44 was designed. The designing was done under my direction and to a large extent in my presence. The type of fitting for which this N-6 Kleenseal nozzle Ex-
185 hibit A-44 was designed is shown on chart No. 3 on the bottom right hand drawing close to the date 1934, and is shown again on chart No. 5, Fig. 2. The fittings shown in Plaintiff's Exhibit 27 are known in the trade as Lincoln Kleenseal fittings.

Chart numbered 19 was prepared under my direction.
186 On the chart the first position that is initialed "Guide No. 1" indicates the manner in which the guide flange rides over the spherical end of the fitting in starting to position the nozzle on the fitting.

No. 2 shows the guide flange at the point of maximum head diameter so that the needle is just about ready to enter the hole of the fitting in the center.

No. 3 shows the needle centered within the hole and it shows the position with reference to the length of the fitting that the guide flange takes when the needle is centered in the hole of the fitting to hold a seal.

No. 4 shows the requirement of the peripheral
154 groove around the fitting to provide a clearance for that guide flange when angling the nozzle with re-

spect to the fitting in order to maintain a seal between the fitting and the needle.

No. 5 shows the frictional grip form of nozzle cap. It shows the same type of needle and shows the frictional grip contacting the diameter of the fitting at two points; that is, the friction sleeve has a bearing contact on both sides of the peripheral groove. That is essential; other-
187 wise the needle would not be held centered absolutely within the hole of the fitting while the manually operated gun is operated. The drawing, Fig. 5, in other words, accounts for the distance of the diameter of the fitting between the bottom edge of the groove and the hex portion. The constructions of the respective devices as actually used on the market are correctly shown on this chart 19.

(Defendants offer the chart in evidence as DEFENDANTS' EXHIBIT C-19 and as illustrating the views of this witness.)

Referring to a copy of a patent to Richardson No. 8,251, dated July 29, 1851; I have read this patent and understand the disclosure therein.

189 (Defendants' counsel conceded that testimony relative to the Richardson patent No. 8,251, which was not pleaded by the defendants in their answer or amended answer, was admissible only for the purpose of construing the patent and showing the state of the art, and not for the purpose of anticipating the patent in suit.)

189 "Mr. Haynes: I might add, your Honor, though that I believe it is within the province of the Court, if the Court finds that the state of the art is such that there was no invention in the claim in issue that it is within the province of the Court to say so in its opinion.

"Mr. Williams: I disagree as to that but I don't know as this is the time to settle it.

"The Court: Let's not take the time now. I have a feeling in my mind that if the Court found the status of the art to be such from any evidence that was submitted to him, then what has been done by the patentee was not invention over what the status of the art was then.

"Mr. Haynes: I understand that is the practice.

"The Court: But we will not discuss that now.

190 "Mr. Williams: I just want to register my dissent for the moment."

The Witness: The drawing of the patent shows what

is termed an oil cup, and its purpose is to receive oil from a nozzle, which is shown in part at the lower drawing. The oiler is of the design that embodies an entrance hole that is sealed with a spring pressed ball valve, and at the opposite end has screw threads for attaching it to the bearing to be lubricated. There is shown in the drawings likewise a spherical end to the oiler and a groove portion beneath the head. The particular shape of that oil cup in that respect, however, has no function from what I have learned of the patent.

(Defendants offer said patent copy in evidence as DEFENDANTS' EXHIBIT A-45.)

155 Mr. Haynes: Q. Will you please explain the construction of the various parts of this demonstrating model?

Mr. Williams: I think I shall object to an answer to that question on the ground that it relates, if it relates to anything, as I understand it to this Richardson patent not pleaded and said to show the state of the art only, and the law is clear beyond any possible doubt or question that a patent offered to show the state of the art must be limited precisely to its disclosure and not to any supplements or additions or changes. That is, it must stand on its own legs with absolutely nothing more. I don't know very much about what this apparatus is but the patent as to what it shows is the clearest patent I have ever seen, and the simplest.

Mr. Haynes: Plaintiff's counsel's argument is, I believe, without weight. I know of no limitation that would prevent an expert from explaining to the Court his understanding of the meaning of a prior art patent, and if that explanation would be made clearer by the aid of a test apparatus I know of no rule of evidence which would exclude it. The objection, if it have any weight at all, would go to the weight of the evidence.

The Court: He may answer subject to the objection.

Mr. Williams: Exception.

156 The Witness: I have a model here which I have
192 constructed along the lines of this Richardson patent disclosure, having a spherical end portion and a reduced portion beneath the head; likewise a hexagonal portion beneath which are threads for screwing it into place. The model is built with a ball check valve which can be seen from the top side, which is pressed into place by a spring.

193 I have a small hand gun that is provided with the high pressure needle and the guide flange cap as shown on chart 19, Figs. 1 to 4 inclusive. I have here before me a test block having a pressure gauge attached and the model Richardson fitting screwed into the test block. I now apply the Kleenseal hand gun and the high pressure needle centers in the hole in the fitting.

I will not operate the hand gun, and after several strokes I have 4,000 pounds pressure. With a little effort I can bring it up to five, and the seal between the Richardson and the nozzle is clean. There is no surplusage lubricant, no loss. The contact is quickly made.

194 The needle centers regardless of from what angle the contact is made. I am demonstrating with the cap that is used on the N-6 nozzle. I make a similar demonstration with a Lincoln Kleenseal fitting. I will first have to release the pressure on the gauge, which I do by turning that knob, and then take the same guide nozzle and center it on the Kleenseal fitting in much the same fashion. The movement of the gun will indicate the manner in which the groove in the fitting permits of clearance for the guide flange of the nozzle.

I now operate the gun and I have 6,000 pounds. I remove it from the fitting and the seal is equally as clean in the case of the Kleenseal fitting as was the case with the Richardson fitting. There is not any more lubricant. There is no surplusage of lubricant lost at the nozzle.

157 Referring to chart 18, prepared under my rec-

195 tion, that chart shows the model of the Richardson fitting having the Lincoln Kleenseal nozzle applied to it. It shows the guide flange clearance below the head of the Richardson fitting. It shows the high pressure needle entering the hole of the Richardson fitting. It shows the spherical end of the Richardson fitting which as the result of being spherical would permit of the guide nozzle to center the needle within the hole of the fitting without difficulty.

The chart 18 likewise shows at the two lower drawings the application of an Alemite hydraulic coupler to the working model of the Richardson fitting. The drawing on the left shows the type of Alemite hydraulic coupler not having the internal contacting needle. The drawing on the right shows the type of Alemite hydraulic coupler that does have the internal contacting needle. In both

of these drawings is indicated the fashion in which the jaws of the Alemite hydraulic coupler wedge under the projection of the Richardson model fitting.

The fittings which I have called the Richardson model
196 fitting was made under my direction solely from the information contained in the patent drawing and specification. This Richardson model fitting which I have constructed is of a size to which I can apply an Alemite hydraulic gun.

I have here an Alemite hand gun with a hydraulic coupler on the end of it which does not have the internal needle. I will first release the pressure of the gauge. I will then snap the Alemite hydraulic coupler over the Richardson model fitting, and unfortunately the gun I am using leaks a little bit in the nozzle, nevertheless I have developed a pressure of 2,000 pounds and have held the
197 seal of the lubricant between the Richardson model fitting and the Alemite hydraulic coupler.

Comparing the drawing on chart 18 called "working model of Richardson" with the Richardson model fitting which is now on the test block, they are the same, as close as could be developed from the drawing shown in the Richardson patent, which of course did not carry dimensions. These Richardson fittings and Lincoln Kleenseal fittings both have the spherical end. They
198 both have the portion under the head to affect a guide and to permit rocking. Both are made of a hexagonal stock threaded on one side and having a truncated end on the other side, which includes a head. They both have a spring pressed ball for checking the flow of lubricant after it has entered the fitting.

(The Lincoln gun and nozzle was marked by plaintiff for identification as Plaintiff's Exhibit No. 41, and the Alemite hydraulic gun just used was marked by plaintiff for identification as Plaintiff's Exhibit No. 42.)

The Witness: The Lincoln Kleenseal nozzle shown on chart 18 is accurately illustrated. There Alemite hydraulic couplers shown on chart 18 are accurately illus-
199 trated. The complete coupler of the Lincoln is not shown on the top drawing, just the guide cap but the part that is shown is shown accurately.

(Defendants offer chart 18 in evidence as DEFENDANTS' EXHIBIT C-18.)

The actual size of the oil cup shown in the Richardson

patent I would say is rather small, because of comparison with the spout of an oil can which is shown in part at the bottom. There is really no reason to arrive at any proportions.

(Defendants offer in evidence as DEFENDANTS' EXHIBIT A-46 the fitting referred to by the name of Richardson fitting.)

200 At the time our company was designing the Lincoln Kleenseal fittings complained of in this suit, I did not have before me the Alemite hydraulic coupler, nor any drawings of the so-called Alemite hydraulic coupler.

159 The designing of the Lincoln Kleenseal fitting here complained of was done under my direction and to the best of my knowledge no one in our organization had before him an Alemite hydraulic coupler at the time we were designing the Lincoln Kleenseal fitting.

I never measured an Alemite hydraulic coupler before the design of the Lincoln Kleenseal fittings and Kleen-
201 seal N-6 nozzle had been completed. We have studied the Zerk nozzle structure because we were concerned with avoiding the scope of the Zerk patent, as outlined to us by our counsel. I am referring to the Zerk patent 1,475,980 which is Plaintiff's Exhibit 11 in this suit.

I have in my hands a tag with a cut-away section of a Zerk nozzle and a Lincoln Kleenseal fitting. I likewise have one complete Zerk nozzle. Before me is chart 17, prepared under my direction. The drawing on chart 17
202 on the upper right hand corner shows what the cut-away section of the Zerk nozzle on the Lincoln Kleenseal fitting demonstrates. The end of the Lincoln Kleenseal fitting is turned to a radius the same as that used in the concave spherical nozzle of Zerk. There is, as a result, a ball and socket contact without a dirt cutting edge, such as is referred to in the claims of the Zerk patent. In the upper left picture on chart 17 it is shown that the Richardson model fitting (Defendants' Exhibit A-46) can be contacted with the Zerk model to form a lubricant seal. The illustrations on this chart 17 are accurate. The true size of the Lincoln Kleenseal fitting is shown in the upper right hand picture, proportionately to the end of the
202 160 Zerk nozzle. The two lower drawings on the chart 17 show actual proportions of the concave end of the Zerk nozzle. They do not, however, show the proportion to which Kleenseal fittings are made. In the lower left

picture the Lincoln Kleenseal fitting is too large and on the lower right drawing the cylindrical portion of the Kleenseal fitting above the hexagonal portion is shown too small in diameter, or smaller than the dimensions to which Kleenseal fittings are made.

(Defendants offer the Zerk nozzle specimens just referred to, in evidence as DEFENDANTS' EXHIBIT A-47.)

We did not have any of the Alemite hydraulic coupler dimension drawings prior to our designing of our Lin-
204 coln Kleenseal fittings and Lincoln Kleenseal N-6 nozzles. We arrived at the dimensions of the Lincoln Kleenseal fittings such as shown in Plaintiff's Exhibit 27-A as follows: The radius of the spherical end was made the same as the radius of the Zerk nozzle. This, of course, was a factor in establishing the diameter of the cylindrical portion. The diameter of the hole was made consistent with what high pressure fitting holes were. The position of the groove was determined by centering the high pressure needle in the hole of the fitting and then positioning the guide flange across the great circle of the spherical end. The needle was located, first centered in the hole of the fitting and then the guide flange located I should say just beyond the great circle of the spherical end, at which point the groove was cut. The point under the great circle was determined upon since it was desirable to utilize that great circle in guiding the nozzle
205 over the fitting to insure the needle centering in the hole. The bevel of the edges of the groove was arrived at by angling the nozzle with respect to the fitting with the needle engaged in the hole of the fitting, as shown
161 on drawing 4, chart 19, and cutting the bevel of the groove so that the inside edge of the guide flange would not come in contact with it. The hexagonal portion as arrived at, from the standpoint of economy and production, minimum size used that would permit of cutting of an one-eighth inch pipe thread. The pipe was standard, and the length of the hex portion was made only sufficiently long to receive a wrench, and the length over all was kept to a minimum for reasons of cost. The diameter of a quarter of an inch is determined by the radius of the head.

162 Proceedings of Thursday, April 16, 1936.

207 As shown at drawing 3 of chart 19, the guide flange of the nozzle cap was positioned just immediately behind the great diameter of the spherical end of the fitting when the end of a needle was centered against the hole in the fitting. This was done in order to utilize the full diameter of the head of the fitting to more accurately guide the needle into the hole. The A-43 coupler cap has no function with the groove in the Kleenseal fitting.

Referring again to the Lincoln Kleenseal fitting, Plain-
208 tiff's Exhibit 27, the groove is provided adjacent the spherical portion in the Lincoln Kleenseal fitting, Exhibit 27 for the purpose of providing clearance for the guide flange when the nozzle is angled to the respective fitting. If the groove were moved further down the fitting it would mean that the nozzle would be angled less than is possible by keeping the groove as close to the head as possible and it would naturally make the fitting longer. It would project further from the bearing which is undesirable, from a design standpoint and from a cost standpoint. Chart 17 was prepared under my direction.

209 (Defendants offer Chart 17 in evidence as DEFENDANTS' EXHIBIT C-17.)

I have instances of the existence of headed type fittings in the art prior to the Butler patent in suit. I refer first to the Seng patent 1,322,357. This patent shows a
163 headed fitting having a coupler for contacting it.

British patent to Griffin, No. 16,086, of 1904, shows a headed fitting.

(Defendants offer in evidence the Seng patent, 1,322,-357, as DEFENDANTS' EXHIBIT A-48.)

(Defendants offer in evidence the British patent 16,086, of 1904, as DEFENDANTS' EXHIBIT A-49.)

211 Dupre patent 927,337 shows a headed fitting.

(Defendants offer this Dupre patent 927,337 in evidence as DEFENDANTS' EXHIBIT A-50.)

The patent to Ulleland, No. 1,253,309, shows a headed fitting.

(Defendants offer this Ulleland patent in evidence as DEFENDANTS' EXHIBIT A-51.)

(It was agreed between court and counsel for the respective parties that there might be a standing objection by plaintiff to any documentary evidence relative to prior

use, or prior invention matter not pleaded, except for the purpose of showing the state of the art.)

The Witness: I recognize the catalog bearing the name "Lincoln Engineering Company, St. Louis, Catalog No. 32, Lincoln Lubricating Equipment." That is a catalog issued by the Lincoln Engineering Company listing its products. It is not the company's latest catalog. There
212 is no date that I can locate on the catalog. From my recollection, it was issued the early part of 1933. On the inside front cover appears a list of patents and trademarks. These are patents owned by Lincoln Engineering Company and I am familiar with them. They relate to the Lincoln Engineering Company's lubricating apparatus in general. It is not quite an up to date list, because patents have issued since this catalog went to press.

164 (Defendants offer in evidence the inside front cover page of this catalog as DEFENDANTS' EX-
213 HIBIT A-52, to show that the Lincoln Engineering Company's lubricating equipment is made under a substantial number of United States patents.)

I recognize bulletin No. 111 bearing the name "Lin-
214 coln Engineering Company, St. Louis." It is a pamphlet prepared by the Lincoln Engineering Company showing Kleenseal fittings and guns for contacting it. The front page of this pamphlet contain the following sentence: "We recommend that only Lincoln Kleenseal nozzles be used to contact Lincoln Kleenseal fittings. The use of other nozzles, and particularly grip jaw types, may result in damage to the fittings." I note on the second page in the inset square a date of a Canadian design, 1935. That assists me in fixing the date when this pamphlet was issued as during the first half of 1935.

(Defendants offer the pamphlet bulletin 111 in evidence as DEFENDANTS' EXHIBIT A-53.)

I know our company's practice as to recommendations of the manner in which our Lincoln Kleenseal fittings are
215 to be used. Our company never recommends that the Lincoln Kleenseal fitting be used with any other nozzle except the Lincoln Kleenseal N-6 or N-1 nozzle. Our company has never recommended such use.

I recognize bulletin numbered Defendants' Exhibit A-54, dated August 7, 1935, bearing at the top the name "Lincoln Engineered Lubrication," and bearing at the

bottom the name "Lincoln Engineering Company, Jack L. Carmitcheal, Sales Manager, Equipment Division." It is a bulletin issued on or about August 7, 1935, by the Sales Department to sales outlets.

165 (Defendants offer this bulletin in evidence as DEFENDANT'S EXHIBIT A-54).

216 I recognize a trade publication bearing the name of the Southern Automotive Journal and dated April, 1935. Referring to page 69 there is an advertisement relating to our company's goods. Referring to page 75, and particularly the top half of that page there is an advertisement which relates to our company's goods. Page 75 shows the Lincoln Kleenseal nozzle, type N-6, that is furnished in connection with a competitive grease gun.

"Q. Do you know who Smith-Johnson Corporation is?

"A. Yes.

"Q. In what business is that company engaged?

"A. Engaged in manufacturing grease guns.

"Q. At that time, April, 1935, were you selling Lincoln Kleenseal nozzles to Smith-Johnson Corporation?

"A. Yes."

217 (Defendants offer in evidence as DEFENDANTS' EX-
218 HIBIT A-55 the title page and pages 69 and 75 of this issue of the magazine. Defendants withdraw page 75 from this exhibit.)

220 The Witness: Referring to a card with some specimens on it: That's a display card that was developed by the Lincoln Engineering Company to show the high pressure Kleenseal nozzle. That card, or a duplicate of it, was issued by our company during the first half of 1935.

(Defendants offer in evidence as DEFENDANT'S EXHIBIT A-56 this card.)

Refering to another card: that was a card prepared by our company for the Mid-Continent Petroleum Corporation. The word "Diamond" is their trade-name.

166 Our company prepared that card during the first half of 1935.

(Defendants offer this card in evidence as DEFEND-
221 ANTS' EXHIBIT A-57.)

The drawings on these two cards, Exhibits A-56 and A-57 represent accurately the construction and operation of Lincoln Kleenseal fittings. The operation of the

Lincoln Kleenseal nozzles and Lincoln Kleenseal fittings in actual use has been successful. From our company's records, the quantity of Lincoln Kleenseal N-6 nozzles sold by our company is as follows: To the end of Feb-
222 ruary, 1936, and including the Detroit plant shipments only for the month of March 1936, the total is 60,242. Our Kleenseal N-6 nozzles have been sold just to the builders of new cars in the first place in connection with guns, and to automotive service stations operated by dealers of the car builders.

Mr. Haynes: There has been a decision by the Circuit Court of Appeals for the Eighth Circuit wherein the Stewart-Warner Corporation, the plaintiff herein, was plaintiff both in the District Court and in the Circuit Court of Appeals, and wherein the Jiffy Lubricator Company was defendant in the District Court and appellee in the Circuit Court of Appeals.

223 The Court: I will have to take judicial notice of it. It is a public record.

Stipulation.

224 Mr. Haynes: I have here a copy of the printed transcript on the appeal in that Jiffy suit, and in the index of this transcript the entries indicate that the trial 167 in that suit before the District Court occurred on January 16, 17 and 18 of 1935, and on February 28, 1935 and on March 1, March 2, March 4 and March 5 of 1935. Possibly plaintiff's counsel will be willing to stipulate that the trial did occur on those days.

Mr. Williams: I will agree the trial occurred on those days.

227 Stipulation.

Mr. Haynes: I have a drawing here bearing at the top the indication, Plaintiff's Exhibit No. 32, and just below it is an illustration of a device bearing the name "Alemite."

Mr. Williams: I will agree that there was in evidence in the Jiffy suit an Alemite hydraulic coupler of the kind shown and marked "Alemite" on this Plaintiff's Exhibit 32 which I have here.

(Defendants offer in evidence as DEFENDANTS' EXHIBIT A-58 the drawing just identified. Defendants rely in the present suit on the top illustration of Defendants'
228 Exhibit A-58. The other illustrations have been cut off.)

Referring to Plaintiff's Exhibit 4, the Butler patent 1,593,791 in suit, I have read this patent and understand its disclosure. As to my understanding of the construction and operation of the disclosure in that patent: Referring to the photostatic enlargement of sheet 1 of the
229 drawings of the patent, Fig. 2 shows a nipple 35 in place within the coupler assembly. From just the fashion that that nipple is placed it is obvious that the segments, numeral 40, are required to move laterally before the
168 nipple 35 can be withdrawn from the coupler. This is for the purpose of clearing the head portion, which I think is 38, as the fitting is withdrawn from the coupler. For the purpose of providing that movement the specification of the patent mentions that spring fingers 42 are provided. And as the drawing is prepared it is obvious that a clearance exists between the inside diameter of the collar 32 and the outside diameter of the spring fingers 42 in order to permit the fingers to flex or open as the head of the fitting is withdrawn and the segments 40 moved laterally. I have a wooden model which may make that more clear. This model is prepared to better visualize the manner in which the spring fingers function as the coupler is withdrawn from the fitting. I have here a wood base block on which is mounted a large size
230 scale section of the fitting. The fitting is black; the coupler socket and the collar are gray; the piston with the spring fingers and segments are red. The sealing member at the end of the fitting is black. I will position the collar on the fitting as shown in Fig. 2 of the Butler patent. It is to be understood that grease occupies the chamber in the rear of piston as at 50, and that that grease is non-compressible even though the pressure has been released, as the patent states is required when it is desired to uncouple. Now, I will place this short pencil behind the piston to represent the grease that is present. With the segments 40 under the head of the fitting, as shown in the Fig. 2 of the drawing, I will withdraw the coupler, showing that the fingers must spring out into

the clearance that is provided in order to permit the
169 head of the fitting to pass by the segments 40. The spring fingers 42 are sprung to about their maxi-
231 mum, and the segments 40 have cleared the large portion of the head of the fitting and the coupler is withdrawn from the fitting.

That demonstration so far indicates the manner of the withdrawal. The manner of application follows along the same lines, that is, the spring fingers function in much the same way. In other words, it is necessary that the spring fingers function in order to enter the coupler over the head of the nipple. Again, I will point out that the piston assembly, including the spring fingers, is in the normal position such as it would be after the coupler had been withdrawn from one fitting and before it is applied to the next. The segments are in position against the tapered ends of the spring fingers. I advance the coupler, and the segments 40 come in contact with the tapered end of the fitting, and as the coupler assembly is advanced the jaws, or segments rather, move out laterally, due to the taper at the head of the fitting, until they reach the maximum diameter when the spring fingers spring to permit the segments to move laterally sufficiently so that the coupler will pass over the fitting. When the coupler advances to its maximum inward po-
232 sition over the fitting, the segmental jaws are snapped into position under the head of the fitting by the spring of the fingers 42.

(Defendants offer the wooden model just demonstrated, in evidence as DEFENDANTS' EXHIBIT A-59.)

170 I can demonstrate the necessity for spring fingers in the Butler structure. I have here another model, wood model, very similar to the one I have just demonstrated, having a headed fitting to the same proportions of A-59, and a coupler assembly likewise to the same proportions, the difference between the two models being in that the model A-60 that I am about to demon-
233 strate has rigid fingers projecting from the piston, rather than spring fingers as was the case with model A-59. When I say "rigid fingers," I mean that these fingers in the model illustrate a section of what would be a rigid cup in an actual coupler. By "rigid" I mean that the spring fingers cannot flex as they are required to flex in

the function of the coupler according to the patent disclosure. Such a rigid cup would not flex either. I have removed from Exhibit A-59 the jaws that were used inasmuch as the fittings are the same size, and I can start with the arrangement shown in Fig. 2 of the Butler patent, placing the segments 40 under the head of the fitting and advancing the piston, including the rigid member that replaces the spring fingers 42, in a normal position such as would exist if there was grease in this chamber 50. I am making my present demonstration on Exhibit A-60. The pencil I have placed behind the piston
234 assembly represents the non-compressible grease that would normally be in that chamber holding the piston in the position shown in the Butler patent, Fig. 2. Now, then, I attempt to withdraw the coupler and it is evi-
171 dent that the jaws are locked under the head of the fitting. There is no movement possible since the spring fingers are not in the model, consequently the
235 coupler cannot be pulled over the head of the fitting. That will show conclusively the requirement in the Butler patent for spring fingers. In my demonstration on the spring finger model, A-59, I showed how it would permit the coupler to advance over the fitting. I will now show the corresponding operation in model A-60. I now remove the jaws from the model A-60 with my fingers and pull the coupler, the assembly back away from the fitting. I now place the coupler assembly just ready to advance over the fitting and I move the piston assembly within the coupler to the normal position and insert a short pencil to represent the grease, and proceed to force the assembly over the fitting. Just as soon as the jaw segments 40 are spread as far as that rigid cup projection member which substitutes for fingers 42 will permit, the coupler assembly cannot be advanced on the fitting any further; indicating again that the flexing of the spring fingers to permit the segments 40 to open to
236 have the fitting enter the coupler is essenttial in the Butler structure.

(Defendants offer in evidence the model just referred to as DEFENDANTS' EXHIBIT A-60.)

I have another model exemplifying my understanding of the disclosure of the Butler patent in suit. It is metal. The fitting I am placing in the model now is one that

Mr. Williams borrowed this morning for inspection and I haven't had an opportunity to replace it. I have
237 172 before me a test board including two test blocks, one equipped with a 10,000 pound pressure gauge and the other with a 5,000 pound pressure gauge. I have in my hands a compressor, flexible hose and a coupler assembly. The coupler is that made in accordance with the drawing of Fig. 2 of the Butler patent with spring fingers modified as I shall show to permit of proper functioning. The top drawing of chart 21 would show a sectional view through the piston assembly, including the spring fingers as they are constructed in this model, to a scale that is in proportion. The scale is larger, of course, than the model I am working with. Now, in order to secure a seal of the end seal member which is 51 in the patent, it was necessary to provide the secondary cylinder within which the end seal member functions to prevent a leakage of lubricant through the slits that go to the base of the piston assembly, to form the spring
238 fingers in accordance with the instructions or information as to how they were formed in the patent. I will force the piston assembly, including the spring fingers, into the coupler body and screw the collar which has three loose segments in place on the end of the coupler body. Now on the test block to which the 5,000 pound gauge is attached there is a model of a nipple, in accordance with the design shown in Fig. 2 of the Butler patent. I will now place the coupler over the fitting. It slides over it easily, and the operation that takes place is what is indicated by the use of the wooden model so far as the segment movement is concerned.

173 I will now turn up on the grease compressor handle, bringing the pressure up to 1500 pounds, which is the pressure referred to in the Butler patent. The
239 coupler is held tight to the fitting as a result of the grease pressure. I take the pressure up to 1500 pounds specifically because the Butler patent mentions that that is a pressure which successfully holds. Now I will release the pressure in the coupling and likewise the pressure,—that is, I am releasing the pressure in the coupling, the pressure behind the piston, unscrewing the handle of the compressor, and the pressure in the fitting and in the pressure gauge is released by this knob on the side

of the block. The coupler will now be withdrawn from the fitting, indicating that the spring fingers within the coupler have served their purpose by permitting segments 40 to move laterally to clear the head on the fitting. I have means for rendering rigid the spring fingers in the model. I will remove the collar with the segments from the coupler assembly which exposes the ends of the spring fingers which I grip and withdraw the piston assembly. I have in my right hand a tubular collar that is rigid and which fits snugly over the outside diameter of the spring fingers, and which is applied to
240 the spring fingers to render them the equivalent of a cylinder, in other words, to remove the spring. The tubular collar which I just mentioned in connection with the piston which supports the spring fingers together form the rigid cup. I am removing the brass collar from the spring fingers. It is rather a difficult job as the collar fits very tightly to the fingers. I am now again ap-
174 plying the tubular collar to the spring fingers over the spring fingers to render the assembly the equivalent of a solid cup. This assembly I will now insert within the coupler body and apply the collar including the same segments as used in the previous test. The coupler now offers considerable difficulty in forcing it over the fitting. It is possible that with quite some manual effort, and gyrating that I might be successful in wiggling the—it doesn't come down, there is still a clearance there between the shoulder of the fitting and the collar of the
241 coupler. I am trying to force the coupler assembly with this rigid cup member on the inside of it instead of spring fingers over the head of the fitting.

Mr. Williams: The record does not show that you have hammered this coupler up and down on the top of this nipple here about twenty times, does it? That is what you have been doing, haven't you?

A. I have not intended to touch the top of the fitting though I am trying to force the piston within the coupler back so that I can get some clearance between the ends of the fingers which are not rigid and the segments 40, so those segments will move laterally and permit me to force the coupler assembly down over the head of the fitting.

Mr. Williams: What you are trying to do is to hammer the grease back into the gun.

A. That is right, I am trying to move the piston back so I can develop a clearance for the segments to move laterally, but I don't seem to be very successful. I am trying to get that coupler on the fitting. I have been successful occasionally.

242 175 Mr. Williams: Have you been really trying to do it now?

A. I have been trying to do it now.

Mr. Koenig: Q. What are you now doing?

A. Still trying to force it down if I can get it down: That is down now all right. I will now bring the pressure up to 1500 pounds and the coupler is held tight to the fitting. I will now reduce the pressure and likewise reduce the pressure in the lubricant behind the piston. I do that by unscrewing the handle of the compressor. Now I endeavor to pull the coupler off of the fitting, endeavor to force the segments 40 laterally to clear the head of the fitting but due to the fact that the spring fingers are not present, permitting the lateral movement of seg-
243 ments 40, the coupler will not come off of the fitting. By laterally I mean radially, with the segments 40 to clear the head of the fitting. I have been successful at times, though, in getting this off. Between the first trial and this last one I have done considerable wiggling on the coupler to get it off the fitting.

244 (Defendants offer in evidence the metal model on which the demonstration has just been made, as DEFENDANTS' EXHIBIT A-61; this includes the coupler and the fittting and the gun.)

(Defendants offer in evidence as DEFENDANT'S EXHIBIT A-62, the test block and the two gauges.)

I have before me chart 21 entitled "Defendant's Mod-
245 els prove Butler coupler is inoperable without spring fingers. This chart was prepared under my direction. The upper illustration was made from the drawing shown 176 in Fig. 2 of the Butler patent with modifications or such changes in the spring fingers as shown in the drawing. The lower figure on this chart was likewise made from the drawing shown in the Butler patent, Fig. 2 with corrections to the spring fingers to permit of a proper sealing for the sealing element 51. It shows the

sleeve which I had in my metal model A-61 to prevent radial outward movement of the spring fingers.

(Defendants offer the chart in evidence as DEFENDANTS' EXHIBIT C-21.)

My understanding of the construction and operation
246 of Plaintiff's Exhibit 8 is that this coupler, since it does not have spring fingers, would not be operable to the extent that it could be used commercially for connecting the coupler to fittings, because the piston assembly does not have spring fingers, but instead has a solid tubular member which cannot spring. I doubt that it could take even the very slightest spring because it is apparently made of brass, it is soft and I don't think it was ever intended to spring. In observing the one jaw element that is part of the coupler I notice the flanged portion is dished or turned up, indicating that it has been subjected to severe rocking, and it is my thought that that rocking came about as the result of gyrating the coupler much in the fashion that I was compelled to do under the last test where a rigid cup assembly was used in order to remove the coupler from the fitting. The manner in which the
247 one segment that is part of this Exhibit 8 is dished indicates that which I have said. I notice malformations on the inner or lower edge of this single jaw of Plaintiff's Exhibit 8. I notice a burr set up on one corner
177 which would be thrown up as a result of misalignment of the segments. In addition the sealing member in this exhibit does not indicate that it has been very practical as to holding the seal, the hole is distorted, en-
248 larged in a fashion which I am quite sure would not function.

Referring to the Butler patent, Plaintiff's Exhibit 4, and to the drawings, Plaintiff's Exhibits 36, 37, 38 and 39, the structure shown in Plaintiff's Exhibit 36 does not conform to that shown in the Butler patent Fig. 2. For one reason, there are no spring fingers shown in Exhibit 36; there are no members equivalent to spring fingers if the jaws which are shown are to be accepted as representing the segments of Butler, No. 40. The Butler drawing shows or indicates a leather sealing member, whereas the sealing member of Exhibit 36 is metal. The Butler construction functions as a result of the piston

moving forward to engage the segments under the head of the fitting because the throat of the fitting is only sufficiently long to accommodate the thickness of the coupler flange 33, and the height of the segments 40. Conse-
249 quently the coupler assembly is fixed permanently with respect to the fitting. When the pressure comes on the coupler shell cannot move; consequently the pressure forces the piston assembly forward, forcing the spring fingers 42 against the segments 40.

In contrast to this the structure shown in Exhibit 36, the fitting is fixed, the end seal member comes against the fitting, the piston comes against the shoulder of the end seal member; consequently when the pressure comes on, the piston is against the shoulder of the end seal
178 member, the end seal member is against the fittting; consequently the piston cannot move forward as a result of the pressure and instead when the pressure builds up behind the piston the cylinder assembly moves backward causing the jaws to be extruded beyond the end of the cylinder. There is a beveled surface between the cylinder assembly and the jaws which causes the jaws to be forced toward the center of the fitting as the cylinder moves back. That is Plaintiff's Exhibit 36.

Referring to the other Plaintiff's Exhibit in that group
250 I have in my hand, Exhibits 37, 38 and 39; the same functioning as I have outlined with respect to 36 would apply to 38 since a shoulder is present on the end seal member. On plate 37 the structure is somewhat different in that there is a needle that enters the hole in the fitting. In this case the jaws are advanced by means of a spring to their furthest position when the coupler goes over the fitting. Consequently, when pressure is applied behind the piston, the tendency is for the cylindrical portion to move backward as a result of the pressure instead of the piston moving forward.

As to Exhibit 39, the same would apply as with respect to 36 inasmuch as the shoulder is present on the sealing member.

251 My statements made with regard to Plaintiff's Exhibit 36, apply equally well to this Defendant's Exhibit A-58.

The Butler patent in suit does not show the element of compressing by forcing any means through an unyielding conically restricted end of a coupler. The pri-

mary purpose of Butler's spring fingers is to provide
179 for movement to clear the head of a fitting such as
252 Butler shows in his drawing. As to possible variations of two thousandths or so to the inch in diameter of commercial fittings; the spring fingers disclosed in the Butler patent have nothing to do with such variations.

(Noon recess.)

254 180 Referring to the Butler patent in suit, the "semi-
255 automatic chuck" mentioned at page 1, line 86 means that the chuck is not fully automatic. It would be only semi-automatic. A chuck was a well known device in mechanical apparatus prior to 1931.

Lavoie patent 1,236,453 shows an air operated chuck.

(Defendants offer the Lavoie patent in evidence as DEFENDANTS' EXHIBIT A-63.)

In Lavoie patent 1,236,453 the chuck is made up of the cylinder 16, the chuck jaws 15, attached to the piston 13.
256 It functions within the cylinder 6.

Lavoie patent 1,295,994 is likewise a similar form of lathe chuck.

(Defendants offer Lavoie patent 1,295,994 in evidence as DEFENDANTS' EXHIBIT A-64).

Oliver patent 926,761 shows still another form of air operated lathe chuck.

(Defendants offer in evidence this Oliver patent as DEFENDANTS' EXHIBIT A-65).

Delaney patent 895,438 shows a form of chuck for actuating gripping jaws with an air piston, air operated piston.

(Defendants offer in evidence this Delaney patent as DEFENDANTS' EXHIBIT A-66).

Referring to Newton patent 1,118,876 and to a photo-
257 graphic enlargement of the patent drawing now on the easel and marked Chart 7: There is shown a hose
181 coupling testing appliance that includes a coupler and a nipple. The coupler includes spring fingers, a packing tube, and a cam for co-operating with the fingers to contract them. There is an apertured piston upon which the fingers are mounted, and it is adapted to be actuated by the fluid that is introduced for testing. The pressure of the fluid introduced automatically causes the spring fingers to press the packing tube into engagement with the nipple, automatically clamping and sealing the

nipple and the coupler by the pressure. The patent refers
258 to fluids. Lubricant grease, of course, is a fluid. I find nothing in the disclosure of this Newton patent which limits the uses of the patent disclosure to apparatus of any particular size. With regard to the Newton patent construction carrying fluids under pressure: Its purpose primarily is for connecting a coupler to a nipple and forming a seal through which fluid can be carried under pressure. Materials of which hose pipes were made in 1914, to my own knowledge were rubber, canvas, fiber and leather.

Referring to Claim 2 of the Butler patent I find the
259 elements thereof in this Newton patent as follows: "The combination with a headed nipple," which would be represented by Number 4 on Chart Number 7, "for receiving lubricant, of a lubricant compressor," that would
182 be an air compressor attached to the inlet line marked Number 2 on chart 7, "having a coupling member for connecting said compressor," that is the air compressor, "and nipple," numeral 4 on the chart, "comprising a cylinder," the cylinder would be made up of numerals 17, 13 and 12 on Chart 7, "a piston," which would be Number 16, "movable within the cylinder," 17, 13 and 12, "and having an aperture," which is numeral 18, "for the discharge of lubricant thereof, an apertured sealing seat," which would be the sealing member 5 in the vicinity of the end of the nipple 4, "carried by said piston," numeral 16, "for engagement with the end of the nipple," numeral 4, "connecting the piston aperture," 18, "with a passage through the nipple," 4, "radially movable locking elements," which would be Numbers 9, 10 and 11 on Chart Number 7, "carried by the cylinder," numerals 17, 13 and 12, "coacting with the nipple," numeral 4,
260 "and actuated by said piston," 16, "for compressively clutching the elements," 9, 10 and 11, "upon the nipple," 4, "whereby the pressure of the lubricant on said piston," 16, "will move the piston," 16, "to forcibly compress said elements," 9, 10 and 11, "while the lubricant is passing through said connecting parts." As to movable elements 9 and 10: It is my opinion that this construction disclosed in this Newton patent would operate for the passage of lubricants therethrough if properly proportioned. I have prepared a model which demonstrated my

understanding of the construction of this Newton patent.

183 (Defendants offer in evidence as DEFENDANTS' EXHIBIT A-67 the copy of said Newton patent).

261 I have here the same test blocks that have been used heretofore. On the test block with the 5,000 pound gauge there is a fitting to the general lines of the fitting shown in the Newton patent. In my hand I have a coupler built to the information contained in the Newton patent, coupled to a compressor unit by means of a flexible hose. I attach the coupler to the fitting by merely slipping it into place, and turn the handle of the compressor until the gauge reaches 1,500 pounds. The coupler is tight on the fitting, and to release it I merely back the handle off on the compressor, advance the coupler slightly, and withdraw it from the fitting. There is an extrusion here of grease. I wouldn't say that it was a quarter of a 262 teaspoon. I would say that most of that was probably in the socket of the coupler when I placed it over the fitting and was extruded as a result of the fitting entering the socket. I would be very glad to do it again. I am now wiping the fitting clean, and I will wipe the end of the coupling clean. I will fit the coupler over the fitting. There is not any grease extruded here that I can observe up to the present time. I am not turning up on the handle of the compressor. There is a slight amount of grease coming out there. Nevertheless, I can build a pressure in accordance with the requirements of Butler, 1,500 pounds per square inch, and the pressure gauge 263 shows that that pressure is held, and the coupler is tight onto the block so that it doesn't come off. The 184 pressure on the gauge is 10 or 15 pounds under 1,500.

I now release that pressure in the same fashion as I have in the past, by screwing the handle of the compressor back, and push the coupler off of the fitting. I first pushed the coupler towards and onto the fitting and then I removed it without any undue effort or without any lateral movement. There is an extrusion of grease there, which is accounted for by the fact that when I placed that coupler on the fitting the initial pressure produced by the 264 grease in forcing the spring fingers out, at the end here is extruded out. In other words, there is a slight extruding of grease, or has been on this particular test, until those spring fingers finally take their gripping position.

I can explain that to advantage by reference to Chart 24. The fingers are represented by the orange color. They are required to move down into the camming position in this cylinder in order to grip under the head of the fitting to which I am pointing here. The action that causes that gripping is the pressure behind this purple colored piston member. Until those fingers are driven forward by the piston to lock the fingers under the head of the fitting, there is a slight movement of lubricant through the aperture in the center of the piston, which flows out between the fitting and the gripping member against the wall of the fitting until the grip takes place. The blue color on this Chart 24 represents the nipple; the green repre-
185 sents the cammed cylinder through which the spring
265 fingers are extruded; the orange color signifies the spring fingers; the brown color the sealing member; the purple color represents the piston; the yellow color represents lubricant within the coupler. The patent reads at page 1, line 56, "an internal expander or short tube 6", without stating the material of which it is made. The tube 6, however, is that internal expander. If this New-
266 ton patent construction were used for the purpose of holding lubricant, a suitable material for this member 5 would be common commercial hard fiber. Chart 24 accurately represents my understanding of the disclosure of the Newton patent 1,118,876, if and when said structure is used for lubrication at high pressure.

(Defendants offer the chart in evidence as DEFENDANTS' EXHIBIT C-24).

267 The model which I demonstrated a few moments ago accurately represents my understanding of the disclosure of this Newton patent if and when such patented disclosure is used for lubrication at high pressure.

(Defendants offer the model in evidence as DEFENDANTS' EXHIBIT A-68. This exhibit includes the fitting).

Referring to French patent to Pinel, Number 327,557. I have read and understand the disclosure in this patent. Referring also to the photostatic enlargement of the drawing now on the easel and marked Chart 11: There is, as shown at B, a fluid receiving portion on which is a nipple *b*. I am referring particularly to Figure 6. In the nipple *b* are serrations. The end of the nipple
268 186 is beveled. At A is shown a tubular member from which a fluid flows. The end of the conduit A is

cupped and threaded as shown at *a*. That *a* shows that to better advantage in Figure 1. The threaded, cupped end is threaded into a cylinder C, at the outer end of which is a shoulder *c'*. Within the inward flange or shoulder marked *c'* and within the cylinder C, there are arranged a set of jaws marked D. Each peripheral set of jaws D is formed of three jaws, as shown in Figure 5. The outer set of jaws D rest against the shoulder *c'*. Both sets of jaws D are surrounded by an elastic band for normally holding the jaws D together. Inside the inner ring of jaws D a piston-like washer E, which may be made of rubber, leather or asbestos or other packing material, is located. The wall of the threaded cup *a* in Figure 1 is thinner than the radial width of the piston-like washer E, as indicated in Figure 1, which is as a matter of fact a slightly different form of the invention.
269 The inner edge of the washer E may be deformed as shown in Figure 1. Conical contact surfaces are maintained between the two segmental rings of jaws D. The device is operated by slipping the cylinder C over the fitting *b*, referring to Figure 6. The jaws D ride over the head of the fitting *b*. Then it is intended that the threaded cup indicated by *a* be threaded into the cylinder C so that the piston-like packing E is forced against the end of the nipple *b* on the one hand and against the jaws
187 D on the other hand. This is to prevent the jaws D from springing outwardly. It is clear that as pressure is turned into the device there will be a tendency to force the fitting *b* outwardly. The pressure will cause the inner edge of the piston-like packing E to follow and to maintain a seal on the conical end of the fitting *b*. The piston-like packing E also tends to extrude against
270 the inner ring of jaws D. This action tends to loosen the inner ring of jaws D, because the jaws of this ring will slide radially on a slanting surface at the rear of jaws D of the outer ring. The piston-like packing E will follow as the inner set of jaws D ride outwardly. The outer set of jaws D will necessarily be forced inwardly against the flat surfaces of the flange *c'*. The device actually operates according to the operation of the Butler device, although the inventor Pinel did not so state.

Comparing claim 2 of the Butler patent in suit with the disclosure of this Pinel patent, claim 2 of the Butler patent reads: "The combination with a headed nipple,"

which in the Pinel patent would be represented by the letter *b*, "for receiving lubricant, of a lubricant compressor having a coupling member," which in accordance with the Pinel drawing would be Figure 6, "for connecting said compressor and nipple," *b*, "comprising a cylinder," C, "a piston," E, "movable within the cylinder, and having an aperture for the discharge of lubricant thereof, an apertured sealing seat," that would be around the end of *b*, "carried by said piston," E, "for engagement with the end of the nipple," *b*, "connecting the piston
271 188 aperture with a passage through the nipple," *b*, "radially movable locking elements," that would be the outer set of the jaws D, "carried by the cylinder coacting with the nipple," *b*, "and actuated by said piston," that would be indicated by the letter E, through the set of jaws D, "for compressively clutching the elements," that is the outer set of jaws D, "upon the nipple," *b*, "whereby the pressure of the lubricant on said piston," E, "will move the piston," E, "to forcibly compress said elements," which is outer jaws D, "while the lubricant is passing through said connecting parts."

(Defendants offer in evidence the copy of French Pinel patent as DEFENDANTS' EXHIBIT A-69).

(Defendants offer a translation of the French text of this patent into the English language, in evidence as DEFENDANTS' EXHIBIT A-70).

272 Stipulation

It is stipulated that the translation of this French Pinel patent 327,557 was made by a duly qualified translator, Rudolph Jung, and that if Mr. Jung were called as a witness on behalf of defendants Mr. Jung would testify under oath to his said qualifications, and would testify that he has made said translation, and that said translation is accurate.

273 189 Referring to the Paul patent 621,276, I have read this and understand it. It describes a coupler and a nipple. The nipple is of metal and is shown at number 10. The coupler member is made up of the tubular members 15 plus 17 and 18, which are threaded together to form the coupler. On the tubular member 18 are pawls No. 20 that are pivotally mounted. There is a piston ele-

ment No. 22 that has an aperture through it for the passage of fluid.

In the operation of this device the nipple member No. 10 is pushed into the opening in the cylinder 17 until the pawls 20 drop into place behind the head 13 on nipple 10. In this position the conical end of the nipple is in contact with the piston 22, or a sealing member 22 which acts like a piston at its inner end.

Comparing claim 2 of the Butler patent in suit with
274 the disclosure of this Paul patent 621,276, claim 2 reads: "The combination with a headed nipple", which in the patent to Paul would be represented by No. 10, "for receiving lubricant, of a lubricant compressor having a coupling member for connecting said compressor and nipple comprising a cylinder," which would be represented by numerals 15, 18 and 17 in the Paul patent.—"a piston" numeral 22 in Paul "movable within the cylinder," 15, 18 and 17 "and having an aperture for the discharge of lubricant thereof, an apertured sealing seat" which would be the bottom or the inner edge of member 22, "carried by said piston" 22 "for engagement with the end of the nipple," 10, "connecting the piston aperture with a passage through the nipple," No. 10 "radially movable locking elements" No. 20, "carried by the cylinder" 15, 18, 17, "coacting with the nipple" 10 "and actuated by said piston" the reaction from No. 22, "for compressively clutching the elements" No. 20, "upon the nipple" 10, "whereby the pressure of the lubricant on said piston" 22, "will move the piston to forcibly
190 compress said elements", 20, "while the lubricant is passing through said connection parts."

(Defendants offer in evidence patent 621,276 as DEFENDANTS' EXHIBIT A-71).

275. Referring to the Ulleland patent 1,253,309, Defendants' Exhibit A-51, it shows a coupling member that is operated by placing it over a fitting having a head. The numeral 6 indicates what is referred to as a gasket of resilient material, and it is slidable in cylinder 5 and is in effect a piston. The spring 8 initially seats it, but as the fluid is going through the coupler the fluid maintains the packing against its seat. The end of the fitting No. 1 has a beveled portion, and the piston No. 6 seats against it. The pawls, No. 3, hook over the shoulder or head
276 of the nipple No. 2, and the reaction tending to separate

the coupler from the nipple tends to tighten the grip between the pawls and the nipple head.

Comparing claim 2 of the Butler patent in suit with this Ulleland patent 1,253,309, claim 2 reads: "The combination with a headed nipple", which is represented by numeral 1 in Ulleland, "for receiving lubricant, of a lubricant compressor having a coupling member for connecting said compressor and nipple comprising a cylinder," Nos. 4 and 5 in Ulleland, "a piston" No. 7, "movable within the cylinder," 4 and 5, "and having an aperture", that's the opening through No. 7 "for the discharge of lubricant thereof, an apertured sealing seat", which is No. 6 in Ulleland, "carried by said piston" numeral 7, "for engagement with the end of the nipple," numeral 1 "connecting the piston aperture" that's the opening through No. 7, "with a passage through the nipple," numeral 1, "radially movable locking elements" numeral 3, "car-
191 ried by the cylinder" Nos. 4 and 5, "coating with the nipple" numeral 1, "and actuated by said piston", which is the reaction due to No. 7, "for compressively clutching the elements", numeral 3, "upon the
277 nipple whereby the pressure of the lubricant on said piston" No. 7, "will move the piston", No. 7, "to forcibly compress said elements" No. 3, "while the lubricant is passing through said connecting parts".

Wurster patent 356,519 discloses an injecting gun. The purpose of the gun is to force lubricant into the axle bearing. The lubricant is forced through what is referred to, I think, as a valve box, and is indicated on the drawing by the letter G. The pump is attached to the opening in the axle without any special wrenches but is threaded into place so that the end of the pump is in sealing contact with the valve box housed in the end of the axle.

(Defendants offer the patent 356,519 in evidence as DEFENDANTS' EXHIBIT A-72).

278 (Defendants offer in evidence as DEFENDANTS' EXHIBIT A-73 a certified copy of the file-wrapper and contents of the Butler patent in suit).

Cross-Examination by Mr. Williams.

I don't recall Mr. Williams' demonstration of the operation of one of the Alemite hydraulic guns and couplers

in combination with one of the Lincoln Kleenseal fittings. Referring to one of the Lincoln Kleenseal fittings and to
279 one of the Alemite hydraulic compressors and couplers, I see a development of a pressure in excess of 4000
192 pounds per square inch.

As to the Alemite hydraulic equipment at the time the Lincoln Kleenseal fittings and nozzles were first manufactured, I knew nothing about the internal construc-
280 tion. I had seen pictures in magazines and trade journal pictures, advertisements, probably a catalog, showing a picture of the coupler particularly. I don't know that the fitting was shown in connection with the coupler. I was familiar with the hydraulic fitting, of course.

The Lincoln Company under one or another name was not in 1920 or thereabouts engaged primarily in the sale of mine cars, manufacturing and selling mine cars. As
281 to its principal business, railway car parts were of more consequence than mine cars. It did, however, manufacture a line of mine cars and mine car trucks and wheels. That was a major item in the manufacturing that was done at that time. For the lubrication of the journals of those mine cars we made these so-called spring oilers and furnished our customers with Keystone squirt guns and other guns to squirt the oil into those bearings.

In about 1925 Mr. J. Henley Frier, the Alemite Company's distributor at St. Louis did not go to the Lincoln Company nor propose that the Lincoln Company manufacture a grease gun for automobile use operated by compressed air, nor did he show us some of the designs and sketches that he had been working upon. I know Mr.
282 193 Frier personally. There was talk with Mr. Frier in 1925 concerning the sale by the Bassick Manufacturing Company of compressor units that had been built and were operating at that time in the Lincoln plant. The Lincoln Company had made compressors, air operated compressors adapted or intended for use with automobiles before we had any conversation with Mr. Frier. The guns themselves were in operation in the plant of the Lincoln Engineering Company before Mr. Frier ever entered the plant. The drawing (Defendants' Exhibit A-31) that I made an assembly of myself personally and built, the drawing of November 20, 1925. which is in evi-
283 dence, shows that thing. I will make this qualification in that the gun that was in operation the first time Mr.

Frier came to the plant of the Lincoln Engineering Company in St. Louis may not have had every exact dimension. The cylinder may have been a little larger or a little longer. This drawing here was the final design of what Mr. Frier looked at at the plant of the Lincoln Engineering Company the first time he came out there, with certain refinements, which were finally purchased by the Alemite Corporation in December of 1925. We had made something that this drawing would represent (Exhibit No. A-31), before Frier came out to the plant. That was done before Frier had any talk with any of our officers about the possibility of manufacturing a gun for use in automobile greasing. As to whether Mr. Frier organized the Frier, Sturgess Incorporated Company, I would not
284 be in a position to answer that. I know that there
194 was a concern.

Q. Now, the first of these compressors and guns that the Lincoln Company made for use in greasing automobiles were sold to or through the Frier, Sturgess Incorporated to Stewart-Warner and its predecessor, the Alemite Corporation, or the Bassick Company, were they not?

A. I am not sufficiently clear on that at the moment to answer definitely. If such a transaction was carried through I should say that it would pertain to a very limited number and would be insignificant as compared to the proportion of guns that were ordered directly by the Alemite Company from Lincoln and invoiced by Lincoln direct to Bassick in subsequent years.

Q. Do you know that it was Mr. Frier who took the first sample to Chicago and showed it to Mr. Otis of the Bassick Company?

A. I do, by reason of the fact that I accompanied Mr.
285 Frier personally on that visit. Frier was the St. Louis distributor for the Alemite Company, and I myself made the first personal contact with the St. Louis Alemite distributor seeking to learn as to equipment they had in their line for sale which was comparable to what we had built for high pressure automotive lubrication. Mr. Frier was not in at the time. I discussed the matter with one of his salesmen, and as the result of that discussion Mr. Frier came to the plant. The salesman's name was Joe
286 Seitz. At the time the Lincoln Steel & Forge Com-
195 pany entered into negotiations to sell these Lubriguns to Bassick, Lincoln had no shipping facilities,

no retail business, no retail trade, no shipping clerk. On the other hand the St. Louis distributorship which Mr. Frier operated had stocking provisions, a shipping clerk, trucking facilities, was acquainted with all the Alemite distributors, knew most if them personally, knew how Alemite conducted their business with their distributors. As the result of that situation the Lincoln Steel & Forge Company arranged with Mr. Frier to warehouse these Lubriguns as they were built and ship them to the Alemite distributors, carrying on such correspondence as was necessary between the Alemite distributors and manufacturers as the manufacturers were concerned with. That terminated probably prior to 1928. If you will permit me to look at some notes I have, I might be able to determine definitely. I have no information here that
287 would permit me to give a definite date.

Q. In this matter of dates you said, by the way, that this Lincoln catalog 32 that was offered in evidence here as Defendants' Exhibit A-52 was published in the early part of 1933. Do you recall that?

A. I think that was my statement, yes.

Q. Now, that book happens to have a copyright date here that I will call your attention to, copyrighted 1934. Do you still say it was published the early part of 1933?

A. I will still say that this copyright note would not indicate that it was published in 1934, for the reason that this may have been a subsequent run of the catalog and that was inserted subsequent to the initial run. I would say it was published in the early part of 1933.

288 196 Q. Now, throughout a period of several years, beginning in 1925 and continuing you don't know for how long Frier, or Frier through the Frier, Sturgess Incorporated Company, received a commission or a payment on each of the guns that your company made and sold to the Alemite Corporation or to Bassick, did he not?

A. He did not receive a commission. He received a warehouse charge that covered his drayage, shipping, warehousing, a bonded warehouse as I recall.

Q. How much did he receive on each gun?

A. I would not undertake to answer that without a reference to records.

289 After a while the practice of turning the guns over to Frier, or to Frier, Sturgess Incorporated, was discon-

tinued and the shipments were made directly to the Bassick Company, and were made upon the orders and directions of the Bassick Company in some instances. We called them P-25 guns. That is the number by which both we and the Bassick Company designated them.

Q. You continued to manufacture and sell those P-25 guns to Alemite or Bassick until the end of 1932, did you not?

A. Well, I should say it was probably before that that we discontinued getting orders for them. I cannot say definitely when without referring to the records. I
290 would say that it was probably within a year of 1932.

Q. Now, at that time the Bassick Company or the Alemite Company had granted some licenses to various people with which you were more or less familiar, had they not?

A. I don't know.

197 Q. Didn't your company write to the Alemite Corporation in February 1933 referring to these licenses, or don't you know about that?

A. I don't recall the incident this moment.

Q. Do you know that this is substantially the fact, that the Alemite Corporation, as it was at that time, represented to your company that its licensees were making power guns of one kind and another which in various re-
291 spects were superior to the P-25 gun which you had been furnishing to Alemite, and urging you and your company to make changes and additional power guns to meet that competition?

A. No. I was in a position to have known of it if it existed.

Q. Is there someone else in your company who would have more knowledge about a matter of that kind than you?

A. Well, I am not sure that there is at this date.

Q. There was some ground of dissatisfaction on the part of the Alemite Corporation insofar as the continued purchase of your P-25 guns was concerned providing no changes were made in them, was there not?

292 A. Not known to me.

Q. Now, you sold your P-25 guns directly or indirectly to the Bassick Company and the Bassick Company under its later name of Alemite Corporation from, beginning

in 1925 and continuing you think until about the first of January 1933, did you not?

A. It was the latter part of 1925, and I would say to some time during 1932.

198 Q. Now, how many of the P-25 guns did you sell directly or indirectly to the Alemite Corporation during that period?

A. 45,141 sold between the years of 1925 and 1933.

Q. And how many of other models of any kind?

A. A total of all models of 65,081.

Q. And you got for those somewhere in the neighbor-
293 hood of $55, did you not, for many of them?

A. The price range was from $14 to $75, roughly. There were many at $14. I have here a tabulation of Lubriguns sold to the Bassick Manufacturing Company Alemite Corporation and Stewart-Warner Alemite Corporation by Lincoln Steel & Forge Company and the Lincoln Engineering Company listed by model numbers for the years indicated.

(Plaintiff marked said tabulation for identification as Plaintiff's Exhibit 43.)

The business of furnishing those guns to Alemite be-
294 came and was throughout those years the major item that the Lincoln Company manufactured and was far and away the major part of our business.

During those years the Alemite Corporation, or the Bassick Company, its predecessor furnished us with its couplers and nozzles to be incorporated by us, or supplied by us, shipped by us with these guns. In that way we became thoroughly familiar with the construction and the mode of operation of those couplers and nozzles.

199 Q. And you became thoroughly familiar during
295 that period with the construction and the mode of operation of the fitting parts with which those couplers and nozzles were intended to be used, did you not?

296 A. We did not have occasion to handle fittings, we handled nozzles only.

Q. That is not what I asked you. I asked you whether you became familiar with the construction and the mode of operation of the fitting part?

A. Not as a result of handling these guns or making them. I knew about fittings. I knew how they worked. I didn't see them made. After they were made I knew in the case of the Gullborg pin fitting it comprises a tubu-

lar member with a cross pin, a ball check valve and a spring below it, and the coupler went on by pushing it on then turning it to give a bayonet connection.

Similarly relative to the Zerk type fittings that were to be used with Zerk nozzles that we put on our guns, we
297 knew just what the construction of those fittings was and how they operated. I knew during the years 1930, 1931 and 1932, for example in 1932, that every automobile and every automobile truck made in this country with the exception of the Duesenberg car, was equipped at its factory with the Alemite fittings of the pin-type or the Zerk type. I saw advertisements or literature containing pictures of the Alemite hydraulic fitting during the middle part of 1933. It was only at the beginning, about February 1933, that the Lincoln Company's business with the Alemite Corporation terminated, and the Lincoln Company embarked in the business of selling its lubricating equipment through channels other than Alemite. We
298 200 learned of the Alemite hydraulic fittings after we had been selling our N-1 nozzle. We began to sell our N-1 nozzle in January 1933, just after the end of the last year of our business with Alemite. We got up that N-1 nozzle to be supplied with our guns as part of our equipment so that we could sell it directly and so the purchasers could use our guns terminating in our N-1 nozzle in the lubrication of automobiles whose bearings were fitted with the Alemite Company's Zerk type fitting.

Q. Now you did more than that at that time, did you not? You made a nozzle of a form such that the cap could be taken off, whereupon there was a second part which could be used in association with the Alemite Company's pin-type fittings, the Gullborg type for the lubri-
299 cation of automobiles whose bearings had those pin fittings in them, did you not?

A. I am not aware of any instructions that Lincoln Steel and Forge Company made to that effect.

Q. Well now, let me ask you again, or another question. You did sell a nozzle which was adapted and intended by you to be used in the lubrication of bearings equipped with the Alemite Company's pin-type or bayonet fitting, did you not?

A. If it could be so used, yes.

Q. Well, you knew that it could be so used and you made it with that knowledge and intention, didn't you?

A. No.

The Court: Were they made at that time by anybody other than Alemite?

300 201 A. No.

Q. If you made one that would fit only that kind of pin-type and that was made only by the Alemite Company, I suppose that was your purpose.

A. Yes.

The Court: Well, if you made it and there was only one type of pin fitting it would work on, it must have been made for the purpose of placing it on that one type.

A. No.

302 Mr. Williams: I hand you Defendants' Exhibit 40. Now that N-1 nozzle is intended to be operated in the manner that I demonstrate here in conjunction with an Alemite Zerk fitting, is it not?

A. Yes.

Q. And I here have developed a pressure of a couple of thousand of pounds, with some leakage?

A. Yes.

Q. That nozzle is made, is it not, so that the outer part can be removed, that is, the part that is intended to contact with the Alemite Zerk fitting, bringing into

303 operative position here an inner part, and I would like you to observe now my application of that part of that nozzle to this Alemite pin fitting. There is no question, is there, but what this is an Alemite pin fitting of the kind that you talked about?

A. That is right.

Q. And that I developed a pressure of some 3,000 pounds, did I not, by the use of that part of your nozzle with the pin fitting?

A. But the pressure isn't retained, it is lost at the gauge.

202 Q. I had a pressure there of 3,000 pounds, did I not?

A. You did for an instant, yes.

Q. Are you in a position of denying that in making these nozzles like this Defendants' Exhibit 40, this part which fits the Alemite pin fitting which cooperates with it in the manner that I have just demonstrated, was made and sold with that intention and purpose? I understood you to say no here in answer to the Court's question a while ago.

A. I still say no.

Q. It will work, will it not?

A. You have demonstrated that it will, after a fashion.

304 At the time we brought out these nozzles I knew that there was quite a number of those pin fittings in use, from my observation of motor cars.

Q. And the fact that you had sold several million dollars worth of guns for use with them, you knew that?

A. Well, I knew that we sold guns, yes.

Q. Well, several million dollars worth, the major part of your business?

A. But they were equipped with nozzles for both the Zerk and the Alemite pin fitting.

Q. Now you took out a patent on this particular nozzle, did you not, of the kind I have just shown you?

A. Yes: Fox patent 1,959,529. That patent says on page 1, line 100,

305 203 "As shown in Fig. 2 the nipple 14 is separable from the body 15 and in its separated condition may be used as a pressure nozzle for delivering lubricant to desired openings, particularly to those larger than those in fittings such as 3. When the nipple 14 is connected (Fig. 1) it forms a part of the body 15, that is, when the device is to be used on a fitting such as 3."

Fig. 2 of that patent shows this inner part unscrewed from the outer part, so as to expose the part 16, and

306 that part 16 is the part which will cooperate with the Alemite pin fitting of the Gullborg patent.

Q. You still say that you did not make and sell those things for the purpose of lubricating bearings equipped with the Alemite pin fitting?

A. No.

There were 500,000,000 of those Alemite pin fittings on cars all over this country, with which our guns could be used for lubricating bearings, because of the fact that that nozzle was made in that particular way.

Q. Insofar as you know, isn't it true that, except for so-called gyp fittings made by infringers who were stopped, with that exception all of the fittings that were put into any bearings of automobiles for five years before you started into the business of selling your lubricating

307 equipment directly through channels other than Alemite, that the only fittings that were put on the bearings of automobiles at car factories were these two, namely, the

Alemite-Zerk type, and the Alemite pin-fitting type. Do you know of any others?

A. There were Dot fittings on cars at that time.

204 Q. They weren't put on during those five years, were they?

A. I don't know. I do not know that the Dot business was brought out by Alemite and there was a complete discontinuance of the equipment of bearings of any automobiles made anywhere in America more than five years before we started in our independent business in 1933. I can not name any automobile that had Dot fittings put on its bearings at the factory after 1925. That means

308 that the only knowledge that we had of the subject when we embarked in this independent grease gun selling business on the first of January 1933, the sum total of our knowledge was that every automobile and every automobile truck made in America was equipped at its factory either with the Alemite pin-type fitting or the Alemite-Zerk type fitting. We were going into the business of selling our guns for use by the ultimate purchasers in greasing the bearings equipped with one or the other of that kind of fitting.

Q. And still you say now that you didn't sell them with the purpose or intention that they should be used in conjunction with pin fittings; do you still adhere to that?

A. I am somewhat confused. I didn't absorb the full significance of your question. I meant to reply that the guns were made to service the Zerk fittings, that we made no definite provision for contacting the pin fittings, we didn't furnish coupler nozzles.

309 205 Q. The fact that they could be used in lubricating those 500,000,000 pin fittings in the field, that was just a lucky incident that you weren't familiar with and concerned with, was it?

A. We were familiar with just that situation.

Q. And, as a matter of fact, if it hadn't been possible to use your guns in servicing cars equipped with those pin fittings you probably couldn't have sold them at all, could you, that is, to any appreciable extent?

A. I couldn't answer that.

Q. Well, you would have had hard sledding, wouldn't you?

A. It would be a guess on my part to answer your question.

Q. Now you say that when you came out with your Kleenseal fittings you had no thought or purpose or intention that they could be used or would be used in conjunction with Alemite hydraulic couplers; that is the purport of your testimony, is it not?

312 A. The purport of my testimony has been that we had no intention that the hydraulic coupler would be used with the Kleenseal fitting. We did not have the intention that Kleenseal fittings should or could be contacted by hydraulic couplers.

Q. Did you know that they could be contacted by them when you first brought out the Lincoln Kleenseal fitting with the peripheral groove and the head?

313 A. No.

206 Q. When did you learn that first?

A. Approximately three months later, sometime during the first quarter of 1935.

Q. When did you first sell some of your Lincoln Kleenseal fittings with the peripheral groove, and so on, as we have been calling it here?

A. About November, 1934, to the Buick Motor Car Company and the Olds Motor Car Company. Those were the first car builders to purchase them; next Pontiac; next Cadillac; next LaSalle; next Ford; also Hupmobile.

314 Q. Now up to Ford, all those others were General Motors Cars, weren't they?

A. Yes.

Q. When did you first sell and deliver guns of any kind in quantity to any of those General Motors car companies?

A. At about the same time the fittings were delivered, during November, 1934. I have a notation here that says that during October 1934 orders were received for the Lincoln high pressure fittings and hand grease guns from

315 two of the larger automobile manufacturers. The General Motors people got interested in the possibility of buying from us a fitting, and we negotiated relative to the approval or standardization of a fitting and those negotiations progressed to a point at which the General Motors Company approved a fitting like the Kleenseal fitting, except that it did not have the peripheral groove.

207 Q. And that all progressed to the point where the General Motors people had made drawings like these that I showed you marked No. 59054, 59055, 59056, 59057, 59059, 59060, all the various angles, different thread sizes,
316 straight fittings, angle fittings, water pump fittings; that is, the whole series had all been drawn up here, and dimensions just as shown in these drawings: you knew about that, didn't you?

A. I knew, yes.

Q. Well, General Motors Company O.K.ed this design, didn't they? They were all set to buy them, weren't they?

A. I have no source of knowledge as concerns that. There was never an order received for them. I knew they prepared drawings such as you show me here. I did not deal with the General Motors Company on behalf of our company. Mr. Hurley, located in Detroit, did that.
317 He is employed by my company, and was in 1933. He conducted most of these negotiations with General Motors. I conducted some myself, just when I was in Detroit.

Q. Who of the General Motors engineers or people did you talk with?

A. Mr. W. L. Barth, in the standards section of General Motors.

Q. Let me show you some other drawings here. Those
318 first ones I showed you were those of the Pontiac Company. That is one of the General Motors divisions, is it not?

A. Yes. We sold our Kleenseal fittings to the Pontiac Division.

208 Looking at these prints marked General Motors approved standards, here is a drawing numbered 109461, straight lubrication fitting; another drawing No. 109462, similarly, General Motors approved standards. That shows a ninety degree elbow fitting. I have seen those sketches heretofore.

Q. Those fittings of that particular kind were approved as standards by the General Motors Company, weren't they?

319 A. I don't know. I never had any knowledge of what General Motors approved. I would surmise as much, but I don't know the procedure of approval. I know the drawings were prepared. On one trip I talked to Mr.

Barth about the design of the contacting fittings. I think
320 Mr. Barth is head of the Standards Division. I talked to him to have him express approval of a design of this kind. I knew that he had to pass on it and that I needed to get that approval before General Motors' Manufacturing Division could buy or be permitted to buy.

Q. Do you mean to say that you don't know anything about any approval by Mr. Barth or the Standards Committee of fittings like those shown in these drawings?

A. I can't say that I do know.

Q. You can't say that you do not, can you?

A. I can't say that I do not, yes.

Q. Now who knows about that, Hurley?

A. I don't know.

321 209 I am not saying that this design was not submitted to Mr. Barth by the Lincoln Engineering Company and that he has passed on these drawings, but as to whether it was he approved it or not, I can't say. I was taking it there in the hope of getting it approved. I did not get it approved (referring to drawing 109,462). This is not what General Motors are using by way of a fitting. I have seen the record in the suit of Stewart-Warner *vs.*
322 Universal and Rogers, at Pittsburgh. I know Mr. Barth testified in that case. I probably learned it from Mr. Haynes. I have read a large part of the record of the
323 trial in that case, but I haven't read all of it. I read Mr. Barth's testimony.

Q. Now as a matter of fact, before you made any initial sample either of the Lincoln Kleenseal fitting with the head and the peripheral groove, you did make in your
324 own shop at St. Louis some fittings of which I show you a sample here and now, isn't that true; straight sided round headed fitting with no groove?

A. Experimental models, yes.

Q. Whether experimental or otherwise, you made fittings.

A. I will say yes.

Q. This is one of them, isn't it?

A. Yes, that looks very much like one of them.

Q. Well, you notice the tag there and the marking, you identified that in St. Louis in connection with a deposition which you were called upon to give in the Universal case, you remember that?

A. Yes, but I don't recall that I identified this particular fitting as having been produced by us.

(Plaintiff makes that fitting for identification, as Plain-
325 tiff's Exhibit 44; and those sales figures, as Plaintiff's Exhibit 43.)

210 Proceedings of Friday, April 17, 1936.

326 Our company first made Lincoln Kleenseal fittings, the one with the head and the shoulder and peripheral groove that we have been discussing during September or October, 1934.

Q. Can you say in which month?

A. October.

Q. None in September?

A. I don't know.

Q. Have you got any original records here that give it, that would refresh your recollection as to the dates relative to these fittings which are in issue here, and corresponding in some way with the letters, invoices and documents of various kinds that you had in connection with those old mine car oilers?

327 A. No.

Q. Now you said, I believe, that within three months after you first made some of these Lincoln Kleenseal fittings you learned that they could be used in combination with the Alemite Hydraulic compressor and coupler; when and where and under what circumstances did you first learn that fact?

328 A. I don't recall a specific instance. Several months after the details of the Kleenseal system were completed, in September, 1934. From three to four months. We had the Lincoln Kleenseal fitting design in September
329 1934, and my best recollection is that we learned of its adaptability for cooperation with the Alemite hydraulic coupler in either December 1934 or January 1935. Our first order for Lincoln Kleenseal fittings came from the Oldsmobile Division of the General Motors Company, and the first which we shipped were to the Oldsmobile Company on November 24, 1934. That was the first shipment to a car manufacturer.

Q. Now from and after the time in December 1934 or January 1935, when you learned that these Lincoln Kleenseal fittings were adapted for complete and perfect
211 cooperation with Alemite hydraulic couplers, you sold these Lincoln Kleenseal fittings with the knowl-

edge and the expectation that they could be so used and that they would be so used, did you not?

330 A. We knew that they could be so used. I had no specific or definite way of knowing that they would be so used. We knew of the existence of the hydraulic Alemite couplers; we did not know that that coupler would function with a Kleenseal fitting, or the manner in which
331 it would function. We knew of a possibility of people having hydraulic couplers and encountering Kleenseal fittings of their endeavoring to make a contact between the coupler and the fitting. We knew in January 1935
332 that there was an Alemite hydraulic coupler in use. We did not know of the coupler at as early a date as we knew of the hydraulic fitting. We learned about the Alemite hydraulic fitting first around the middle of 1933 or probably somewhat prior to that time by a month or so.

Q. May?

A. Thereabouts I should say. Car manufacturers began to put them on their cars in April about 1933. I only
333 learned about them after those cars reached St. Louis. I knew about it in May. We learned about the Alemite hydraulic coupler which was gotten out by the Alemite Company for use in combination and conjunction with those Alemite hydraulic fittings. I am unable to set a date for the first hydraulic coupler that I saw. It was probably within 1933. I can't recall a specific instance. I may have seen them in service stations on guns, just observed them. It was my business to sell our equipment if I could in those stations at that time. I saw advertisements of these things in July 1933, and advertise-
334 ments probably every month thereafter. I didn't have enough interest in them to go and see one that year. I observed them before January 1935. At least as early as January 1935, we had learned in some way that our
212 Kleenseal fittings would cooperate perfectly in conjunction with those Alemite hydraulic couplers and compressors which we had seen and become familiar with
335 at that time. From and after January 1935, we sold our Lincoln Kleenseal fittings with the knowledge that the purchasers would probably use them in combination and conjunction with those Alemite hydraulic compressors and couplers. That knowledge of probability was based on the fact that hydraulic couplers were being used for lubri-
336 cating automobiles. I didn't know of any car or truck

made in America other than the Deusenberg that didn't leave the factory with Alemite hydraulic fittings on it, by the end of 1933.

Q. That meant that for a whole year, more than a whole year prior to January 1936 when you learned about the possibility of using your Keenseal fittings with the Alemite hydraulic couplers and guns, every car made in this country with the exception of the few Deusenbergs had these Alemite hydraulic fittings on them, and you knew that throughout that entire period, and knew that the effort of the Alemite Corporation had been to put these Alemite hydraulic couplers into the hands of every garage and service station in the country; you knew that too, did you not?

337 A. I did not know what the Alemite Corporation did or what their endeavors were. I saw advertising matter pertaining to Alemite hydraulic couplers. I knew those couplers were designed and intended for use in conjunc-
338 tion with Alemite hydraulic fittings.

We did not terminate an exclusive sales agreement
339 with the Alemite Corporation. In our efforts to sell our guns to garages and service stations after we terminated the exclusive sales agreement with the Alemite Corporation, it was our effort and the major part of our business as a matter of fact, to sell our guns in these garages and service stations after the N-1 nozzle was available,
213 which was about the first of 1933. Up to that time all of our guns had been sold with Alemite couplers or nozzles, either the Gullborg type or the Zerk type, for
340 automotive use. They were delivered to us and we put them on all our guns and boxed it up complete, and they were sent out that way uniformly.

341 Q. In order to sell your guns when this exclusive arrangement with Alemite was terminated, you devised and began to equip your guns with your N-1 nozzle, did you not?

342 A. Yes. We began to send out our guns with our own N-1 nozzles in place of the Gullborg and Zerk nozzles and couplers which previously we had gotten from the Alemite Company and put in the boxes and crates with our gun.

343 Q. So your main business at that time, in fact your sole business in the lubricating field except as you may have had a hang-over of some mine car business, but in

so far as anything that is of interest here is concerned, the whole of your business was the manufacture and the effort to sell your power guns to large greasing establishments, such as public service stations and garages, and perhaps fleet owners, like big stores and that sort of thing; that was your business at that time, wasn't it?

A. Yes.

344 Q. Now from the time when you first had a knowledge that your Kleenseal fittings would probably be used by the ultimate purchasers in conjunction and combination with Alemite compressors and hydraulic couplers, right down to the present time, that has continued to be a matter within your knowledge, has it not?

A. Yes.

214 Q. Now up to the time when there was this change in your relationship with the Alemite Corporation as of about the first of January 1933, you or your company had not manufactured or sold any high pressure lubricating fittings for use, or adapted for use on or in automobiles of any kind whatsoever, had you?

345 A. That is true, yes.

Q. Now after you began the undertaking of selling your automotive lubricant compressors through trade channels other than Alemite, you sold them with the knowledge and expectation that they would be used exclusively in combination with the fitting parts manufactured and sold by the Alemite Corporation, did you not?

A. With the knowledge but not with the expectation.

347 For at least five years before the first of January 1933 every automobile made in America had been equipped at its factory either with the Gullborg pin-type fitting or the Zerk type fitting as manufactured and sold by the Alemite Corporation. When we began to sell our guns after this change in our relationship with the Alemite Corporation, we sold them with the knowledge and the expectation that the purchasers would use them in combination and conjunction with those Alemite fittings, of one kind or another, either the Gullborg pin-type or the

348 Zerk type, and in no other way. That continued to be the fact for a period of at least four months, that is, until the Alemite Corporation began the sales of its new Alemite hydraulic equipment in April of 1933. From that time on, April 1933, or perhaps in May 1933, it was a matter of knowledge and expectation on my part and

that of my company, that the automotive compressors sold by us would be used also in combination and conjunction with the new Alemite hydraulic fittings so far as that was possible.

Q. Well, it was possible, was it not?

A. Not on the first hydraulic fittings that were
215 put on motor cars, referring to the fittings that were shipped in which there was a little triangular hole in
349 the end instead of a circular hole. That difficulty came to our attention right quick in approximately May 1933. We went right at it to complain to the motor companies that they were putting on a new fitting with which our needle nozzles could not be used, and we brought every possible pressure to bear to get them to require that the hole be made round. That was vital to our business life.
350 And they were changed to round holes. I didn't learn in connection with that episode of the triangular holes, anything about the hydraulic coupler that was to be used with those fittings that had those triangular holes. I was concerned with the fitting, not the coupler.

I myself did not take this matter of the triangular holes up with any of the automotive companies; never talked to any motor car company about it. I probably discussed it with people casually, with Alemite distributors
351 probably, or with Alemite salesmen.

When our first Kleenseal fittings were sold to the Oldsmobile division of the General Motors Company, or first shipped at any rate, on November 24 1934, I knew that our fittings were going to displace other fittings. I had no specific knowledge as to what the fittings would replace.

Q. At that time you knew that the Oldsmobile car, like every other car except Duesenberg, had been equipped for more than a year with the Alemite hydraulic fitting, did you not?

A. I can answer yes generally, but with respect
216 to specific care and the times they were equipped with fittings I had no definite knowledge or source of knowledge.

Q. Well, regardless of the length of time, you knew
352 that Oldsmobile prior to the time you first delivered your Kleenseal fittings to it had been using Alemite hydraulic fittings, and nothing else, for the equipment of the bearings of those cars, did you not?

A. No. I would not have that information.

Q. You, as I recall, were the vice president in charge of the designing and all the manufacturing of your company at that time, and the executive head of the company?

A. Yes.

Q. Relying on mechanics to make the metal parts and on salesmen to contact prospective customers and so on?

A. Yes.

Q. Now, through the channels in which you conducted your business and tried to manage it and direct it, you
353 knew the facts, did you not that I have just stated to you, namely, tht Oldsmobile and Buick and Pontiac, all these cars to whom you began to sell your fittings had previously used the Alemite hydraulic fittings exclusively, you knew that in that way, did you not?

A. Yes.

In order to sell these Lincoln Kleenseal fittings with the head and the shoulder and peripheral groove to the automobile manufacturing division of the General Motors Company it was necessary for us to make up a whole line of high pressure fittings having different thread sizes and different lengths and different angles and various check valves and so forth to meet the requirements of adaptability and accessibility to the various locations on an automobile. In a general way between 20 and 36 fittings are installed on an automobile, differing with different
217 cars and the system of lubrication used.

354 The General Motors Company publishes so-called standards sheets showing the various lengths, angles, thread sizes, check valve arrangement and so forth of the high pressure lubricating fittings to be purchased and installed by its automobile manufacturing divisions. I have seen sheets prepared by General Motors showing their standards, giving all minutia of detail.

Q. I have here some papers marked or entitled "General Motors Standards", and then a sub-caption "Type C straight lubrication fittings", and this particular page is marked page R-4, and there is a similar page R-5. Those are the General Motors Standards sheets showing
355 the Alemite hydraulic fittings of various thread sizes and lengths and angles and check valve arrangement, are they not?

A. Yes.

(Said Standards Sheets are marked for identification as Plaintiff's Exhibit 45.)

Mr. Williams: Q. I have counted and I think there are 34 different types shown there, or different forms, differing in size of the thread, the angle at which the business part projects from the part that goes into the bearing, the length of the fitting, some are longer and some shorter, some have different check valve arrangements from others, the business ends for contacting with the couplers being the same in each instance. I don't know whether you want to count them, but that in general is what that shows, is it not?

A. Yes.

Q. Now, I would like to call your attention to two
356 other sheets that I will mark for identification Plaintiff's Exhibits 45-A and 45-B, and now these three as Plaintiff's Exhibits for identification No. 46-A, 46-B and 46-C.

218 Q. Now, those standards sheets I suppose you worked from right along, didn't you?

A. No, I have no occasion to work from them.

Q. Well, you have seen them?

A. I have seen similar publications.

Q. As a matter of fact when the General Motors Manufacturing divisions order from you they designate the things that they order by these very numbers appearing on these sheets, don't they?

A. Yes.

Q. And in order to know what they want when they order, for example, something that is marked here No. 126,122, why you determine what is meant by that from just such data as appears on these sheets, do you not?

A. Not necessarily. We work from our own shop drawings.

357 Q. As a matter of fact the drawings were copied from these, were they not, or vice versa?

A. Yes, they are duplicates in so far as dimensions and design are concerned.

Q. Now is not it also the fact that these sheets 46-A, -B and -C, with the exception of the top row on 46-A, which is the continuation of the Alemite hydraulic line, is not it a fact that for every one of all of these thirty odd fittings of the various thread sizes and various lengths and various angles and various check valve arrangements and so forth, that for every one of the Ale-

mite hydraulic fittings as shown on these standards sheets there is a duplicate Kleenseal fitting having exactly the same thread size, exactly the same length, exactly the
358 same angle, exactly the same check valve arrangement and so forth?

219 A. I cannot answer definitely as to that inasmuch as I have never undertaken to compare the Alemite line of fittings with Kleenseal, fitting for fitting.

Q. Well, supposing you just look now at two or three of them. Here is one, an internal pipe thread of the "type C straight lubrication fittings, internal pipe thread", is it not, referring to Plaintiff's Exhibit 45-A?

A. Yes. And that has a part number 109,349, the internal pipe thread.

Turning to the standards sheet showing the corresponding Kleenseal, that appears here on sheet 46-A, and is entitled "Type D straight lubrication fittings, in-
359 ternal pipe thread". That has a number, apparently 126, 122. The number is shown for that fitting on 46-A. Whether the dimensions correspond throughout I have not checked. However, the purpose and design of the fitting would be the same. It would go into the same location to do the same work.

Q. Now, here it happens that the length of the Alemite hydraulic, the length over all is "L", that is given here as three-quarters of an inch, approximately, is it not?

A. No, that's not right because that's the external pipe thread fitting and you have reference to the internal pipe thread fitting.

Q. You are right about that. What is the length given there for the internal?

A. That shows the Alemite type C, the approximate over all length being given as 1-7/64ths inches.

Q. What is given for the Kleenseal fitting shown?

A. On Exhibit 46-A it is shown as 1-7/64ths.

360 220 In a general way without checking through each one of these dimensions, just looking enough to see whether it is not true in general, there is a similar correspondence between all the dimensions of the angles and thread sizes and all these details of the Alemite hydraulic type marked type C on these standards sheets and the Kleenseal type marked type D on these sheets.

Q. Now, when you began to sell your fittings to Gen-

eral Motors, why, you had to tool up and set up to make up their orders and deliver quickly all of these thirty odd different forms and styles of Kleenseal fittings, did you not?

A. No.

Q. How many?

361 A. Just such sizes as we received orders for, probably five or six at the start, and more from time to time subsequently.

Q. Now, these various dimensions, as for example that 1-7/64ths inch in over all length, such dimensions as that are entirely arbitrary, are they not? It might have been made 1⅛ths, for example, or 1¼?

362 A. No.

Q. Well, why do you say no? Is there some reason why they must have been in both cases exactly 1-7/64ths inches long?

A. It is determined by the requirements in applying the fittings to the car, to my knowledge.

Q. Well, if it were another 64/100ths inches long, do you think it would have made any difference?

A. No, in a general way I doubt that it would.

Some of those fittings have the business part projecting at an angle of 45 degrees with respect to the screw-in part.

221 Q. That could have been 44, 40, 50, any of those things would have been all right, would it not, equally satisfactory?

A. In a general way I would say yes. Some of them are 67½ degrees, some 22½.

Q. You knew, did you not, that when the automobile manufacturing division of the General Motors send these automobiles of theirs out for sale in the United States. that it is done with the knowledge and expectation that 363 the purchasers will have their cars greased in more or less public garages and service stations? Is that true?

A. In a general way, yes.

Q. You gave figures here on your direct testimony, relative to the number of Lincoln Kleenseal nozzles of one or the other or both of the N types which you had sold. Do you recall the figure.

A. My recollection is that it was some sixty odd thousand total.

I did not give any figures relative to the number of the Kleenseal fittings which we had sold. I did not give the number of the Lincoln N-1 or N-6, or any other Lincoln
364 nozzles which we had sold to automobile manufacturing companies. I cannot give that figure.

Q. I want to get the number sold to automobile manufacturing companies.

A. Well, I would have no way of telling. That segregation is not available.

Q. You did not sell any of the automobile companies enough of your compressors or enough of your Kleenseal nozzles, either with or without compressors, to equip anywhere near all the automobiles manufactured by them, did you?

A. Generally, I should say no.

365 222 Q. The guns that you sold, or the nozzles that you sold to automobile manufacturing units, like Oldsmobile for example, were sold to them to be put in the tool kits of cars to be exported into foreign countries, were they not?

A. They were to be put into tool kits of cars. What the car builders did with the cars afterwards we had no knowledge of. At the time we furnished Kleenseal fittings and guns with nozzles on them we had no knowledge as to what particular automobiles the guns were furnished with.

Q. Do you deny knowing that Oldsmobile, for example, puts one of those guns into the tool kits of the cars that it sells for export and that it does not put any such gun into the tool kits of cars that sold in the United States? Is not that your information as to how your business is done and to what end?

A. That in a general way, yes. I have no specific in-
366 formation to bring to bear as proving it for instance.

Q. You must have some people working for you and you must rely on what they tell you and what they do for you.

A. Yes.

Q. In the way that you know all the matters, substantially all the matters about the business which you in some measure run as vice president, you do know, do you not, that the Oldsmobile division of the General Motors Company puts a gun or compressor in the tool kits of its cars which are sold for export and does not put any

gun or nozzle into the tool kits of the cars which it sells for distribution in the United States?

367 A. Well, in a general way, I will say yes. In the same way it is true of Buick, Pontiac, and Cadillac. That means that by and large all of these General Motor cars onto which our Kleenseal fittings are installed at
223 their factories by their builders, that when they go out for ultimate resale for use in the United States that they go out with our Kleenseal fittings on them but
368 with no Lincoln nozzle or gun for use in conjunction with those fittings and means that all of those General Motors cars on which our Kleenseal fittings are installed, that when they are sold in the United States the purchasers are expected to go to the garages and service stations and have their cars greased by greasing mechanics who are equipped with the compressor and the coupler part of the combination necessary to effect the greasing.

We made our first shipment of Kleenseal fittings to Oldsmobile on November 24, 1934. From and after that time we began to make large shipments, not only to
369 Oldsmobile but within a few days, I think December 3, 1934 to Buick and to Pontiac, that is, they all started very promptly as soon as we received orders and we got orders within a week or two from Oldsmobile and Buick and began to fill those orders all within a week or two. I don't think Pontiac orders came through until after the first of 1935.

Q. Now, you did not at the outset furnish any of the Lincoln Kleenseal guns, did you, you began shipping Kleenseal fittings first and the guns after a while, is not that true?

A. No. The guns went out at approximately the same time that the fittings were shipped. I have no record
370 here that would show the facts in that regard. I did testify about that fact in a deposition that I gave in the Universal case at St. Louis.

Q. You have the records available there and looked them up, did you not?

A. I don't recall my testimony in that deposition at the moment.

371 224 Q. I would like to call your attention again to one of the papers that we were discussing yesterday namely this one entitled "General Motors Approved Standards" No. 109,461 with the title "Straight Lubri-

cation Fitting." Now, the fitting shown on that print is a round-headed and straight-sided fitting, with no head or shoulder or peripheral groove.

A. That is right.

Q. The dates appearing on that print are, if I can read it "6-22-34, Released" and then the date "7-3-34, Miscellaneous Minor Revisions," do you see?

A. Yes

At those dates, I or others in my concern, my corporation, coacting and cooperating with me, had submitted for the consideration of the General Motors Standards section fittings of the kind shown in that print.

Q. And of the kind shown in another somewhat simi-
372 lar print entitled "General Motors Approved Standards" and numbered 109,462, is that right?

A. I am not sure that any style other than the straight as shown on drawing 109,461, was submitted.

Q. It is true, is it not, that General Motors did make a series of Standards drawings like the two I have brought to your attention here, and which I think now I shall mark for identification as Plaintiff's Exhibit 47 applicable to No. 109,461 and as Plaintiff's Exhibit 48 applicable to 109,462. Now, the General Motors Company did make a set of drawings along in the summer and early fall of 1934 showing the whole line of round-headed and straight-sided fittings having business ends like those
373 in these two prints but with various thread sizes and various lengths and various angles and so on in order to make the fittings adaptable to the various locations and situations in which they might have to be used?

225 A. I don't know.

Q. Well, you know you were working with them and encouraging them and they were responding to your encouragement, and they went a good way, don't you know that?

A. They made up such drawings as these, I will say yes.

Q. Do you know this, that when they came to make the drawings showing the peripheral groove which was subsequently cut in to form a head and shoulder on these fittings that they took those same drawings and had a draftsman alter them, with the exception of these two, do you know that?

A. I don't feel that I can answer to something that the General Motors did, I don't know. It did not come to my attention that they did just that.

Q. That is, that they revised these drawings of the round-headed and straight-sided fittings which you had
374 been importuning them to buy, and at the last moment before they bought them changed all the drawings to include the groove, do you know that?

A. I don't know for sure. I don't believe that this particular drawing (Plaintiff's Exhibit 47), for instance, could be, just as shown here, changed to include a groove and represent the Kleenseal fitting.

Mr. Williams: Q. I agree with you, and that's why they made a new drawing on this particular day, you know they did that, they made up another drawing?

A. Yes.

On these two, 109,461 and 109,462, Exhibits 47 and 48 respectively, they could not very well have incorporated the groove merely by cutting it into the fitting without some other change. They are too short from the appearance. But the others of the large number, 30, what-
226 ever there may have been, all they had to do was to
375 show the groove cut into the periphery of the straight-sided fitting.

Q. So that as to these two drawings they made new ones?

A. What they did I cannot tell you.

Q. Let's look at the Standards sheets and see if that does not appear clearly and obviously to have been the fact. On the final Standards sheet showing the ultimate form which the Kleenseal fitting took with the groove you do find one corresponding with 109,461, do you not? I mean corresponding except for the change that I have referred to?

A. There is a number 109,461 on Exhibit 46-A that is the same style of fitting, that is, has ¼th inch pipe thread and is a straight fitting.

Q. And made just a little longer here in the business part so as to provide the room to put in the groove?

A. Yes It is long, yes, and it has a groove.

(Noon recess.)

377 227 **FOSTER HOLMES, Witness for Defendants:**

Direct Examination by Mr. Haynes.

My name is Foster Holmes. My age is forty-six; I
378 live in St. Louis, at 7716 Augusta Avenue. I am the sales manager of the Lincoln Engineering Company. I have been connected with that company approximately four or five years. I don't recall just when I assumed the title, sales manager, but my activities have been selling all of that time. I had the title of sales manager as early as July 1, 1933.

I recognized the piece of paper dated July 18, 1933,
379 Defendants' Exhibit A-41. It is a sales bulletin issued by myself as sales manager, to all of our distributors. That is my signature at the bottom of the sheet. That sales bulletin was sent out by our company to all of our distributors on or about July 18, 1933.

(Direct examination closed).

Cross-Examination by Mr Williams.

380 Q. You said, Mr. Holmes, that letters or bulletins like this were sent to your distributors; what do you mean by your distributors?

A. All of our sales outlets; our selling agencies in various cities throughout the country.

381 228 **JOHN R. LEVALLY, Witness for Defendants:**

Direct Examination by Mr. Haynes.

My name is John R. LeVally; age forty-three; residence 1129 East 45th Street, Chicago, Illinois; occupation Vice-President of the Lincoln Engineering Company of Illinois, an Illinois corporation, which is one of the defendants in this suit. I am one of the individual de-
382 fendants. My company has no corporate connection with the Lincoln Engineering Company of St. Louis, a Missouri corporation.

Q. I didn't mean corporate connection, I mean what business relation do you have with them?

A. As distributors of the grease guns and the fittings, the line complete.

Q. By what trade-mark are those guns and fittings known?

A. They are known as the Lincoln Kleenseal grease guns. We have been selling that equipment for approxi-
383 mately three and a half years; since approximately the first of 1933. I am familiar with the so-called Alemite hydraulic nozzles of which there are specimens here on the railing. I am familiar with the so-called Alemite hydraulic fittings of which there are specimens here. I am familiar with the so-called Zerk nozzles and fittings. I do not recommend that the Lincoln Kleenseal fittings be used with the Alemite hydraulic nozzles. This has been true throughout my selling of Lincoln Kleenseal fittings.

229 Q. What recommendation do you make as to the manner in which Lincoln Kleenseal fittings should be used?

A. In connection with the Lincoln Kleenseal nozzles.

Q. To the best of your knowledge has anyone in your organization recommended that Lincoln Kleenseal fittings be used with Alemite hydraulic nozzles?

A. No.

384 I heard Mr. Cornell testify in this suit on April 14th.

Q. His testimony related to an alleged sale of some Lincoln Kleenseal fittings which have been marked Plaintiff's Exhibit 27; have you endeavored to ascertain what member of your organization might have made that sale?

A. I have. I have not been successful. I have endeavored to locate someone in our organization who would have recommended to Mr. Cornell at that date that the Lincoln Kleenseal fittings be used with Alemite hydraulic nozzles. I have not been successful in finding anyone. The sales people who were with me at the time Mr. Cornell mentioned, are still with me. All of them.

385 I am familiar with the so-called Lincoln N-1 nozzle of which I have a specimen marked Defendant's Exhibit A-40. I and my company have sold such nozzles for contacting the Zerk or the hydraulic or the Lincoln Kleenseal fittings. We sold this N-1 nozzle for use with aperture that had no fittings on them. Such apertures would

be located on the steering column or on the uni-
230 versal joints of an automobile. In order to use the N-1 coupler on steering columns, for example I would not use the entire coupling as I now have it in my hand. I would remove the end of the N-1 nozzle, and I would use this smaller nozzle for volume. Pressure in lubri-
386 cating a steering column is not desirable.

Q. When you use this end part only of the N-1 nozzle for lubricating a steering column do you develop much pressure?

A. No, sir, it is open.

Q. What keeps you from developing much pressure?

A. The hole is wide open.

There is some way that I can change the arrangement of parts in that N-1 nozzle for cleaning it. This needle quite often plugs up with dirt, that dirt being contained in the lubricant, and in the sale of these N-1s it is our recommendation that to clean them we take off the cap and reverse it, placing the end of the inside nozzle on the end of the outside nozzle, and by operating the gun the pressure blows out the dirt backwards and cleans the needle. We always recommend to purchasers of the N-1 nozzle that the device can be cleaned in that way.

387 I have seen Zerk nozzles used on Lincoln Kleenseal fittings. I have seen Zerk nozzles used on Zerk fittings. I have seen Zerk nozzles used on Alemite hydraulic fittings. Of those three combinations of nozzles and fittings, I find that the three combinations work equally well.

231 I have never sold N-1 nozzles to manufacturers of compressor equipment not manufactured by Lincoln Engineering Company of St. Louis, but I have sold it to their distributors. I have sold Lincoln N-6 nozzles to distributors of compressor equipment other than Lincoln. I have seen N-1 nozzles in use on compressor equipment made by others than Lincoln. I have seen N-6
388 nozzles on compressor equipment made by companies other than Lincoln.

(Direct examination Closed).

(No cross examination).

232 FREDERICK A. FAVILLE, Witness for Defendants:

Direct Examination by Mr. Haynes.

My name is Frederick A. Faville. My age is forty. I live at 1202 Lake Avenue, Wilmette, Illinois. I am distributor of Lincoln Engineering of Illinois. I am Presi-
389 dent of that company. That is the same company with which Mr. LeVally is connected. I am one of the individual defendants in this suit. My company is the Chicago distributor for Lincoln Engineering Company of St. Louis. I do not recommend that Lincoln Kleenseal fittings be used with Alemite hydraulic nozzles. That has been true throughout the time that we have been selling Lincoln Kleenseal fittings.

Q. What recommendation do you make as to the manner of use of Lincoln Kleenseal fittings?

A. With Lincoln N-1 nozzles.

Q. And with the N-6 nozzles, too?

A. As well, yes. To the best of my knowledge none of our associates or employees of our company or its predecessor have recommended that Lincoln Kleenseal fittings be used with Alemite hydraulic nozzles.

(Direct Examination Closed).

(No Cross Examination).

233 ALEXANDER P. FOX (Recalled), Witness for Defendants:

390 *Cross-Examination continued by Mr. Williams.*

A paper purporting to be page R-10 of the General
391 Motor Standards sheets shows one of the Lincoln hand guns and also an Alemite hydraulic gun. I have seen sheets like this.

(Said page is marked Plaintiff's Exhibit 49 for identification.)

392 This round-headed and straight-sided fitting of which I made a sample before I added the cut-away peripheral groove will coact perfectly with the Lincoln N-1 nozzle; the hole in the fitting will coact with the needle. The

whole fitting doesn't coact. If I put in to a bearing, or into a hole leading to a bearing one of these round-headed and straight-sided fittings which I made like Plaintiff's Exhibit 44, and then apply to it a compressor terminating in the Lincoln Company's N-1 nozzle, the bearing can be lubricated after one gets the needle in the center of the hole. You can get it there but with some difficulty. Then operating the gun, grease will be injected.

With the Lincoln Company's N-6 nozzle you can apply that similarly to this round-headed and straight-sided
393 fitting like Plaintiff's Exhibit 44, and inject grease into the bearings. You can apply to this same Plaintiff's Exhibit 44 one of the Alemite Zerk compressors and nozzles and inject grease into the bearings. If, however, you attempted to combine one of the Alemite hydraulic compressors and couplers with this round-headed and straight-sided fitting there would be no groove into which the jaws could clamp; no head or shoulder against which they could act. You could use that combination satisfactorily.

234 Q. Now the interchangeability of the Alemite hydraulic fittings and the Lincoln Kleenseal fittings in
394 combination and conjunction and cooperation with the Alemite hydraulic couplers was essential to the adoption and use of these Lincoln Kleenseal fittings by the General Motors manufacturing corporations, was it not?

A. I interpret your question there to infer that I would know something about what General Motors required.

Q. Well, you do know, don't you?

A. No.

Q. You dealt with them?

A. Sold them Kleenseal fittings.

Q. Now didn't you learn in connection with that extended development and negotiation that the General Motors people regarded that interchangeability as essential in the field?

A. No.

Q. Is that interchangeability advantageous to the General Motors Company? I mean by interchangeability
395 that the Kleenseal fitting when applied to a bearing of an automobile can be used in combination with an Alemite hydraulic coupler and compressor in the same way that

an Alemite hydraulic fitting can be used in greasing the bearings of that automobile.

A. No.

Q. Now suppose I buy a General Motors automobile having on it Lincoln Kleenseal fittings, and I do not get with the car any grease gun, and at the end of five hundred miles I want to have my car greased. I can as the matters now stand, and as they have stood from the beginning, drive into any garage or service station
235 which has in its equipment an Alemite hydraulic compressor and coupler, and the garage man can combine that Alemite hydraulic compressor and coupler with the Lincoln Kleenseal fittings on my car and grease the car, can he not?

A. He is free to attempt that, yes. He can't do it
396 entirely satisfactorily. The groove in the Lincoln Kleenseal fitting is not designed to accommodate the jaws of the hydraulic fitting properly but it does accommodate them so that the compressor coupler takes hold, hangs on and permits the grease to be injected but not under pressures running up to 10,000 pounds per square inch, if necessary. The hydraulic nozzle with the needle in the center will hold a higher pressure than the one without the needle, for the same reason that the Lincoln Kleenseal nozzle will hold a higher pressure than the Zerk concave face.

Q. How do you happen to know that?

A. I know the testimony here shows that the curva-
397 ture in the hydraulic nozzle was made the same as the curvature of the Zerk nozzle. I see in the exhibits here that you have and in the drawings of the nozzle with the needle and without the needle.

Q. Have you ever used one of the Alemite hydraulic couplers at all?

A. I have had them in my hand, and applied them to a fitting.

Q. What pressures are you able to get with the Alemite hydraulic couplers in conjunction with the Lincoln-Kleenseal fittings?

A. I have never conducted a test to determine just that.

236 Q. Do you have any doubt that pressures run-
398 ning up to 10,000 pounds can be secured and held?

Take the needle form; any doubt about it as to the needle?

A. No; if the needle fits the hole properly that it would hold up to 10,000 pounds.

Q. You don't have any reason to doubt the fact that it does fit the hole properly, do you?

A. I have never inspected the needle, never had an opportunity to know the dimensions as to which the needle is made, and I have had considerable experience in designing the needle of the Kleenseal system.

Q. Take the other form of Alemite hydraulic coupler without the needle; do you say that won't transmit and hold a pressure in excess of 10,000 pounds per square inch.

A. I am not prepared to give definite pressure readings. I have never made actual test with that in mind.

399 Q. I don't know whether I said the combination of the Lincoln Kleenseal, I meant to, Lincoln Kleenseal fitting and an Alemite hydraulic coupler with a single rather than a double seal, do you dispute or question the fact that with that combination you can develop pressures in excess of 10,000 pounds per square inch?

A. I don't think you can get 10,000 and hold 10,000 pounds to the square inch.

Q. What do you think can be gotten?

A. I don't feel qualified to say, I never tried it. I

400 recall Mr. Williams tested with that cone point in a pin-type fitting at 3,000 pounds.

Q. Don't you remember the very first thing I asked you yesterday was to look at one of the Lincoln Kleenseal fittings and I got the gun and put on it the Ale-

237 mite hydraulic coupler and showed you that the two things would work together, and developed a pressure which ran up over 5,000 pounds?

A. Yes. However, I don't recall the type of nozzle you used, whether it had the needle in the center or was a straight Zerk curvature.

Q. Now for the moment assuming that the Lincoln Kleenseal fittings when combined in use with Alemite hydraulic couplers will inject grease or permit the injection of grease into the bearings at pressures in excess of 5,000 pounds per square inch, would that not be an advantage to the General Motors Companies in buying and installing Kleenseal fittings?

A. No.

Q. Would it not be an advantage to purchasers of a car equipped with Lincoln Kleenseal fittings?

401 A. No.

Q. To be able to go into a garage or service station where the operator had in his possession an Alemite hydraulic compressor and coupler which he could use with those fittings, wouldn't that be advantageous to the owner of a car?

A. Not necessarily, no.

Q. Did Mr. Barth tell you, Mr. Barth the Chief Standards Engineer of the General Motors Company, either directly or through some of your subordinates and associates in negotiating with the General Motors Company, that this matter of interchangeability in the sense in which I have described it, was essential from their standpoint to the use of the Lincoln Kleenseal fittings?

402 238 A. To the best of my knowledge, no.

403 I have here Lincoln Company's bulletins No. 111, Defendants' Exhibit A-53, and bearing this paragraph: "We recommend that only Lincoln Kleenseal nozzles be used to contact Lincoln Kleenseal fittings. The use of other nozzles, and particularly grip jaw types, may result in damage to the fittings." What was referred to there as nozzles of grip jaw types was principally the 404 Alemite hydraulic nozzles. At the time these bulletins were issued, I knew of no other nozzle of anybody's which was or could be called the grip jaw type. What that was intended to mean to parties interested in the lubrication of automobiles and other machinery was that we did not recommend the use of our Kleenseal fittings with Alemite hydraulic couplers.

Q. When was it that you first issued any bulletin or notice or warning in that language, or in other words of the same general effect?

A. This, I think, is the first. Bulletin 111 was printed 405 some time during the first half of 1935. I have no records here that would enable me to fix that date more closely. We put that recommendation into this bulletin for the reason, as the bulletin says, that the use of the jaw type nozzle would result in damage to the upper part of the groove of the Kleenseal nozzle by the jaws of the jaw coupler. In disconnecting the hydraulic coupler the practice is to snap the coupler sideways. It cannot be removed

by pulling in a direct line. Consequently when the coupler, the hydraulic coupler is snapped sideways the jaws are held taut within the groove by the pressure, assuming the pressure has not been released, and even in
406 239 cases where the pressure has been released, there is some pressure that the jaws exert to the underside of the groove which distorts or damages the upper edge of the groove.

Q. Have you ever known that occur, actually?

A. Yes. Many times, on experiments that I conducted myself, since I have known of the hydraulic coupler and since the Kleenseal fitting has been in existence. I knew
407 of the hydraulic coupler at the time that the Kleenseal fitting was made. I had not inspected it: I had made no test with it at that time but I had observed it.

Q. I suppose you knew that this trouble would occur?

A. The fact would come to my attention through our men in the field; salesmen that run into those condi-
408 tions. I don't recall of a specific instance. I have no specific names of sales representatives to offer.

Q. When did they tell you that, first?

A. Some time during the latter part of 1935. I am speaking at random now.

409 Q. How do you reconcile what you have just said about how you learned these things?

A. I don't reconcile the dates. In as much as the publication there was issued during the first half of 1935 it necessarily follows that the matter was of knowledge to us at that time. I don't know how I got that knowledge.

Q. You never learned it by any trial in your own hands?

A. Afterwards, yes. The situation must have been brought to my attention during the first half of 1935. I verified it by taking a Kleenseal fitting and putting a hydraulic coupler onto it. Then the jaws damaged or dis-
410 torted the upper part of the groove in disconnecting it.

240 Q. Did it damage it much, make it unusuable?

A. It depended upon how often the fitting was contacted with the nozzle.

Q. Did you manage to damage it often enough, any one fitting often enough so it was unusable thereafter.

A. It was damaged to the extent that we would not want the Kleenseal fitting damaged by it. I never saw

one that went out of useful commission because of any such damage.—

Q. You never saw one that was damaged in this way to an extent so that it would not continue to function, did you?

A. It would not function in connection with the guide type Lincoln Kleenseal nozzle because taking off the hydraulic nozzle threw up a burr on the edge of the fitting which interfered with forcing the guide type cap of the N-6 nozzle over the fitting. That happened in such experiments as I conducted personally.

411 Q. Did you succeed in doing that more than once?

A. Yes, probably more than a dozen times.

We have here a Lincoln Kleenseal fitting. And we have here an Alemite hydraulic compressor, a small hand type. There are Alemite hydraulic compressors capable 412 of developing much higher pressure than this particular one. That terminates in an Alemite hydraulic coupler.

Q. Now, I am going to walk into a position where I can bring a little weight to bear on this fitting, and I will ask you to observe and state, if you will, whether you see the development of grease pressure.

(Mr. Williams operates apparatus.)

Q. Do you see the needle go to 5000 and above; 6500; 7500; 8500?

A. Yes.

241 Q. That's holding a pressure now of approximately 8500 pounds, it is not?

A. Yes.

Q. Now, I would like you, without my doing anything 413 except to leave this gun and the coupler attached to the Lincoln Kleenseal fitting, to demonstrate this damage which you say you have observed so often.

A. I am not just lifting the gun in a straight line with the center line of the fitting,—it won't become disengaged if that fittings is anchored. I will anchor the gauge and fitting permanently, and now endeavor to pull the nozzle off the fitting by a straight pull. It does not come off. The jaws of the coupler are bearing against the underside of the groove of the fitting, holding the hydraulic nozzle onto the fitting. It hangs on tight. In order to get the nozzle off the fitting it is necessary to snap the nozzle at an appreciable angle to the center line of the fittings, which I will now do.

Now the nozzle is off the fitting with the nozzle at approximately an angle of 45 degrees with the fitting. In moving this nozzle to that angle the jaws on the far side have to ride up and out of the groove in the fitting. The contour of the groove of the Kleenseal fitting is not spherically shaped.

414 Q. What I want you to do is to just show where the damage occurred. You cannot see any damage with the naked eye?

A. It is so small you cannot see very much of the thing with the naked eye. I see marks there that I was

415 anxious to have the magnifying glass bring out. There 242 is a high light which would come about as the result of metal being pushed against metal by pressure right along the line here underneath the head, if you look closely under the head and get the light to reflect on it properly to see.

Q. If we just took that fitting out of there we could, perhaps detect that damage to better advantage.

A. Before we take that out may I suggest we mark the side of the fitting? I will mark it with red pencil, the side that was against the gauge.

Looking through a twenty-power microscope there is

416 a brighter mark.

Q. Well, can you find the spot?

A. Yes. I note the distinction. A high light underneath this side of the shoulder, where I put the little red pencil mark.

(Plaintiff has that Lincoln Kleenseal fitting just taken out of this test block, marked for identification as Plaintiff's Exhibit 50.)

Q. Let's have another one of the Lincoln Kleenseal

417 fittings. Won't you put that in the test block here and go after it with this Alemite hydraulic gun and see how much damage you can do on it until you are worn out? Maybe you had better look at it first and see whether it is in good order before you start?

A. May I have your explanation, Mr. Williams, as to how this gun operates.

Q. (Demonstrates operation) You can either relieve the pressure as you have been doing right along by opening this valve, or without relieving the pressure you can move the compressor and the nozzle to an angle of, not

45 degrees, but whatever you see there, and withdraw
243 it. Just demonstrate this damage which occurs, as
418 you say, to the Lincoln Kleenseal fitting when used in conjunction with the Alemite hydraulic coupler. The fitting seems to be in good order before you start, does it?

A. May I remove this from the gauge and inspect it?

Q. If we have got to take the time I suppose you can. Can't you just give it a half turn there and look it over?

A. I could, but I cannot see underneath. I cannot get the light in the right position. (Removes fitting and examines it.) Yes, this fitting has a high light on the edge of the upper groove at the point where the groove meets—the outside diameter. That's as the result of this test you have just made in snapping the fitting off. You did that just now when you raised the pressure gauge here. It is not damaged, but it is marked.

Q. You get some of your Kleenseal fittings. Here is
419 one, the Exhibit 27-A, Kleenseal fitting in evidence. Now, won't you pick any one of those that is in good order and then put that in the test block and with the Alemite hydraulic compressor and coupler demonstrate this damage that you say occurs?

A. The gauge reads 6,000 pounds pressure after having pumped the Alemite gun that is connected to the Lincoln Kleenseal fitting. While the gauge shows about 5,600 pounds at this moment, I am of the opinion that that pressure does not exist in the coupler nozzle; instead, atmospheric pressure prevails within the nozzle. Consequently there is no pressure holding the jaws under or within the groove of the Kleenseal fitting other than possibly a spring pressure which I suspect is in this nozzle.

244 Now, then, to remove the nozzle from the fitting I will snap it sideways. The nozzle came off the fitting with very little or no effort, indicating that there was no pressure holding the jaws in engagement with
420 the groove of the fitting. I am using an Alemite hydraulic compressor and coupler, and it is a duplicate of Plaintiff's Exhibit 13. The exhibit does not have grease in it, the duplicate does. Otherwise they are exactly identical.

(Plaintiff marks the duplicate that Mr. Fox is using as Plaintiff's Exhibit 51.)

421 The Witness: I have placed the Alemite hydraulic

gun on this block and brought the pressure up to 6,000. It dropped. I am taking that same fitting after having hooked the gun onto it and I remove it from the block.

(Plaintiff marks said fitting for identification as Plaintiff's Exhibit 27-A-1. It is already in as 27-A.)

422 The Witness: The Exhibit 27-A-1 shows a mark, a high light at the edge of the groove nearest to the spherical end indicating that the edge of that groove has been subjected to a rubbing action by the metal in the jaws of the coupler. The fittings from which this one was taken on the card do not show a similar high light. That high light is the start of the damage.

Q. Now, put one on there, a new one, and do a lot
423 of damage, all the damage you can do in, say, three minutes, or five minutes after you get it on there.

A. I cannot do the damage because the coupler of that gun does not retain pressure.

Q. Must it retain pressure in order to do the damage?

A. In servicing with a high power gun where the pressure is against the nozzle of the gun there would be more damage. There is damage with Alemite hydraulic compressors with hand guns, but it takes a longer time to bring it about.

245 I see that power gun in evidence here, the Plaintiff's Exhibit. I have seen Alemite hydraulic compressors like this Exhibit 20. It is an electrically operated
424 gun. That is the kind that does this damage. If this gun were used instead of the hand gun, the damage would be brought about quicker.

(Plaintiff takes another Plaintiff's Exhibit 27-A fitting and marks it Plaintiff's Exhibit 27-A-2.)

425 I am not sure I can bring about the damage in fifteen minutes that I would like to have.

426 The Court: Well, is there any contention from the defendants that the manner in which these two elements cooperate, the Kleenseal fitting and the Alemite hydraulic gun, is not a satisfactory one for operable purposes in servicing automobiles?

Mr. Haynes: That works to a commercially satisfactory extent, yes, your Honor.

427 Q. Will you look, please, at this Plaintiff's Exhibit A-43. This exhibit as I understand it represents a sleeve which can be inserted within the outer shell,—may we call

it that? I don't know what name you give to it, of this Lincoln Kleenseal nozzle.

Am I not putting that in there correctly? Does not that drop in here?

A. It goes in in that fashion, yes. When the nozzle as a whole is pushed over the fitting this spring sleeve
428 will push down over and around the fitting in such a way as to make the nozzle cling with some degree of force to the side of the fitting. That snap-on ring is in the form of some spring fingers, made by taking a cylindrical member here and cutting some slits in it.

Q. And that construction corresponds with what you understand to be the construction of the Butler patent, does it not, when the Butler patent speaks of spring fingers?

246 A. I have not associated this in my mind in any way with Butler's spring fingers.

Q. No, but I thought it would be interesting to ask you to do that now, and so I am asking you whether this spring, these spring fingers of yours do not correspond with what you understand the Butler spring finger arrangement to be in that both are in the form of a hollow cylinder with some longitudinal slits cut through the walls
429 of the cylinder so that although the parts have a good deal of stiffness they still have an element of give or spring?

A. No. They still differ from Mr. Butler's spring fingers.

There is a good deal of rigidity about the spring fingers of the friction collar. That is why it is so hard to push the snap-on ring over the fitting.

Q. Nevertheless if you push hard enough you can secure a little give there, can't you?

430 A. No. You can't put the snap-on finger on in that fashion when it is housed in this cap. It is housed in the cap in this fashion, forced in and the outside diameter of this snap-on collar is machined to very close limit is with the inside diameter of the collar to purposely limit the extent to which this snap-on collar can expand. Therefore, the snap-on collar is backed up by the cap when it is forced over the fitting. I cannot conveniently hold it in here with my fingers to force it over. I can assemble the whole part.

Q. Before you do that though, let's see if I cannot, as

you did during your direct testimony. You did take it out and push it over the fitting, as I recall, just as I am doing, didn't you?

431 A. It is weaker now than if in the collar, but is possible by a good strong push to push it over.

247 Q. I have done it here now?

A. Yes.

Q. When I did that why, those spring fingers of this snap-on ring yielded a little bit, didn't they, as I pushed?

A. Very, very little, but they did yield a little bit, enough to permit the thing to go on.

Q. And, therefore, they have an amount of springiness requisite, such an amount of springiness as is requisite to the accomplishment of this result of pushing the snap-on ring over the fitting, have they not?

A. Yes, due to the way you apply it.

Q. You were able to get those things apart in your direct, I don't know whether you can do it now or not.

A. I will try. I can't take it off.

432 Mr. Haynes: May I ask Mr. Fox what he does want? I will be glad to get it for him if we have it.

The Witness: A small gun with just a snap-on nozzle on the end of it. I don't need the whole gun, the nozzle is enough.

Q. See if you can get this off with these pliers, will you?

A. (Witness does as directed) I am afraid I cannot help you on that without doing damage.

The Court: Let me see it. (The Court pulls it apart.) I have got it.

Mr. Williams: Q. Now, put it the way you want it and let's see what happens when you push it over the fitting.

Mr. Haynes: Mr. Williams, I have just handed you
433 a small hand gun for the witness' use.

A. It simply goes on harder after the snap-on collar is in place in this.

Q. It seems to go on all right, does it not?

A. Yes.

Q. You think this went on harder this time than it did before, do you?

A. Well—

248 Q. Whether it did or not you have got right there in that little snap-on ring, have you not, a cylinder

which is slitted into spring fingers in such a way that the spring fingers will yield a little under such pressures as we have been applying, and yet with sufficient stiffness and strength to make it impossible for anyone but the Court, apparently, to get the things apart after they had been put together, is that right?

434 A. Yes, they yield as much as the purpose requires. Still they exert a very very strong force upon the thing embraced within the spring fingers, namely, in this instance the Kleenseal fitting.

I have here the sample of the round-headed and straight-sided fitting, marked as Plaintiff's Exhibit 44. I have not tried this, I don't know whether the diameter of 435 that is such that this snap-on ring will slide over that fitting or not. If the diameters are relatively right it will do so.

Q. And there is a wire on here that might interfere a little. I hope we won't have to take it off.

Mr. Haynes: I will be glad to remove the wire, if you wish. It is there merely for the purpose of holding the exhibit tag in place.

Mr. Williams: Q. Well, I am pushing that on with my fingers, am I not, to get it started?

A. Yes.

Q. There, I got it on all the way, did I not?

A. Yes, just about.

The Court: All but the wire.

Mr. Williams: Q. If the wire were not there it would be all the way, would it not?

A. Yes.

249 Q. Now, when was it that you first manufactured any of these snap-on rings?

436 A. From memory I should say the latter part of 1934 or the first part of 1935. I don't recall any record that would show that. There is no advertising of that at all here. We have never advertised it or shown it in any catalog or in any circular. We have some record in St. Louis of manufacturing or something that would show when we first made those.

Q. I wish by telephone or otherwise, you would get a record and bring it up here, if you are willing, to show when you first made those things?

A. Yes.

250 Proceedings of April 20, 1936.

438 As to when we first made and sold the snap-on friction caps like Defendants' Exhibit A-43: There was a drawing showing the friction snap-on coupler dated September 7, 1934. I verified the fact that the first production lot was started during October 1934 and completed
439 during November 1934. Referring to Chart No. 5: This friction cap is shown at 87 and 91, perhaps at 89 in this chart No. 5, which is a reproduction of the drawing of Barks patent No. 2010174; and the section is taken in that drawing right through this slit in the cylinder. The slit is shown at 91 in Fig. 4. Now if the section had been taken on any other plane than that through the slit, then the forward part of that snap-on ring would have been
440 cross-hatched all the way to the end. The Butler patent shows cross-hatching all the way to the end. If in Butler that forwardly projecting small cylinder 41 were slitted from the forward end back, then if the section had been taken through the slit way to represent it accurately in a drawing it probably would not have been cross-hatched just as the forward part of our snap-on sleeve is not cross-hatched.

As to when the Lincoln Company's bulletin No. 111,
441 Defendants' Exhibit A-53, was published: I have located a company bulletin, our No. A-53, that states that bulletin No. 111 is just off the press. That makes the date for No. 111 August 7, 1935, as closely as I can determine.

There were no fittings produced at the time this catalog Defendants' Exhibit A-39 was published, in March 1933.

251 To the best of my knowledge Lincoln Company's N-1 nozzles were adapted and intended to cooperate with high pressure fittings of the design shown on sheet 4, which were referred to commercially as Zerk fittings, manufactured by the Alemite Corporation. Of course, I have no definite means of knowing what the Alemite
442 Corporation actually manufactured. To the best of my knowledge, our shipping memorandum No. 8816 of January 28, 1933, was the earliest record I could find of any
443 sale of any of our N-1 nozzles. I don't recall having seen the majority of these clippings from various trade journals just handed me, showing the sectional views. The advertisements that I recall were more like the Automo-

tive Merchandising page of September 1933. As to the
444 Automotive Daily News of November 29, 1933: I don't see that publication. No automotive trade publications come to my attention specifically or definitely. The advertising department of my company subscribes to some of them but they don't necessarily come direct to my attention. I don't follow the matter of what the trade is doing in these automotive trade publications. I have never heard of the publication "Automobile Topics". I
445 have never seen that ad or one like it, December 30, 1933. I am quite sure in my own mind that I never saw anything that would show the internal structure.

I never saw this notice in the Automotive Journal Motor Row and Garage Dealer of August 1933.

I think I have seen this one in Automotive Merchandising, of September 1933, or one like it.

252 I never saw this one in the Petroleum News and Service Station Merchandising, of July 1933; we don't get that publication.

I don't think I saw this one in the Implement and Trac-
446 tor Trade Journal of March 24, 1934; nor this one in the National Petroleum News of July 12, 1933. We do subscribe to the National Petroleum News, however. I look at it when occasion presents itself, when the magazine is handy. As to the one in the October 1933 issue of Motor West: I never heard of that publication. I can't recall having seen the one in the Lubricator Maintenance, of July 1933.

As to the one in the Detroit Supercharger of January 1934: I never looked at the Detroit Supercharger; I didn't know, in fact, that it was in existence.

As to the one in the Implement and Tractor Trade Journal of January 27, 1934: I never saw that publication.

447 As to the Farm Implement News of January 18, 1934: I would not have access to farm implement trade papers.

"The National Petroleum News" is a publication that I know of; but I don't know that it is the leading one in its field. As to the advertisement in the National Petroleum News of March 7, 1934, reading "Warning. Unless you have adaptors and fittings for the new Alemite hydraulic system you cannot adequately service 99% of the new 1934 motor cars.": I have never seen this advertisement heretofore. As to the one in Bus Transportation for July 1933: We don't subscribe to Bus Transporta-

448 tion. I am not familiar with "Automotive Industries".
253 When we started in this business of selling our lubricating equipment to service stations and garage men in about the first of 1933, I recall having seen the "National Petroleum News" at that time. I don't recall any other definite name.

I knew there was such a thing as a hydraulic coupler. I didn't see the internal structure, didn't examine the
449 hydraulic coupler, I had seen advertisements. From the time the thing first came out, in April 1933, up to the time that we sold our first fittings a year and a half later, in November 1934, I never inspected, never checked, or never looked at the hydraulic coupler. I have seen pictures of it such as I have identified in the sheets shown to me. I have never examined the ones showing it in cross section; never looked at one. To the best of my knowledge I did not see one.

(These advertisements and reading notices were marked for identification as plaintiff's Exhibit 52, seriatim A, B, C, D, E, and so forth.)

450 I have here a letter addressed to J. E. Otis, Jr. of the Alemite Corporation on the letterhead of the Lincoln Engineering Company, dated February 21 ,1933, and signed by Frank S. Barks, president of Lincoln Engineering
451 Company. I conferred with Mr. Barks or other officers of the company relative to some phases of this letter. I knew that the letter was sent. That was an important matter of policy for our people to decide. I participated in the discussions and knew the letter was written.

(Said letter is marked for identification as Plaintiff's Exhibit No. 53.)

452 254 I directed more or less the designing of the Lincoln Kleenseal fitting insofar as drawings by draftsmen were concerned. The patent covering it, that is, patent No. 2010174 I think lists three inventors, Frank S. Barks, Alexander P. Fox and Williams Z. Linders. That means that all three brought their resources to bear in designing that fitting. Mr. Barks is president of our Company, and Mr. Linders is shop superintendent. There
453 are no others that I know of. The entire responsibility for the configuration, contour, shape, size, dimensions and so forth of the Lincoln Kleenseal fitting is divided between Barks, Linders and myself. Mr. Barks was the man who was mainly in Detroit in conference with the General Motors people but he was not there for weeks on

end. From about June or July of 1934 into, perhaps, October, he was there off and on, not permanently. I would not say half his time; it is difficult to say any specific
454 amount. Mr. Linders was in Detroit about that time off and on on this matter too. Mr. Hurley had nothing to do with the design. He was in contact with the motor car builders at Detroit. I myself conferred in part. Mr. Barth was the extent of my contacts. Of the patent people there, Mr. Spencer, Mr. Blackmore, Mr. McEvoy, I
455 have met only Mr. Blackmore. I talked with him to some extent in connection with these negotiations as a part of them about the patent question. I am not answering for Mr. Barks or Mr. Hurley. And insofar as I, myself, am concerned I still say, as I have said, that I did not see or did not know of the internal structure of the Alemite
456 hydraulic coupler. I never discussed it with Mr. Blackmore or Mr. Barth. Nor to the best of my recollection, with Mr. Barks nor Mr. Linders, other than the fact
255 that it did exist. Nobody in our organization was interested. I did learn, what was in it in January 1935, to the best of my recollection.

The first Alemite hydraulic fitting that came on the market to our knowledge had a triangular hole in the front or at the entrance, instead of the round hole, as these fittings Plaintiff's Exhibit 14 have. As to when the Alemite hydraulic fittings like Plaintiff's Exhibit 14 with the round hole, first came on the market, I have no definite knowledge in that regard. I would say, from memory,
457 probably August or September, 1933. It was before that date, September 1933, that we complained to the automobile manufacturers about the presence of the triangular hole. In connection with those representations and complaints about the triangular hole, I don't recall having seen the Alemite hydraulic fittings. I knew that when the needle was inserted in the triangular hole that it wouldn't seal the joint, the grease would leak out. The same thing would have been true with the N-6 if it had
458 been available at that time. In connection with our complaints about the triangular holes, we saw some of those fittings. I can't say that we learned what the diameter was, and the length, and the contour of the part which was gripped by the hydraulic coupler. Our concern was with the fact that the triangular hole existed in the fitting. We saw fittings; had them in our hand; looked at them. I took no measurements off. We experimented in an en-

deavor to see whether the N-6 nozzle would seal against there to force lubricant through. That was done in
459. 256 St. Louis for the most part. We did have this test of the Alemite hydraulic fitting in our shop at St. Louis before September 1933. As to whether those Alemite hydraulic fittings with the triangular hole had the same diameter and the same length and the same size and location of the peripheral groove as did the later Alemite hydraulic fittings which I first saw in about September 1933: I am not sure of that. I don't know. I took no measurements. I am not aware of any difference except that the first fittings had serrations around the sides and rather marked grooves on the truncated part which the later fitting did not have. The grooved part, or the neck which forms the head and the shoulder of that fitting, that was just the same insofar as I know or can recall as that first Alemite hydraulic fitting with the triangular hole as in the later one with the round hole. The whole of the contour of the triangular hole fitting and the round hole fitting is identically the same insofar as the parts which
460 engage with the gripping jaws of the Alemite hydraulic coupler are concerned, so far as I know or recall the appearance of the fittings. I am not sure with respect to the way the jaws contact with either fitting. I don't know of any difference. I am the Alexander P. Fox who is one of the patentees of ptaent No. 1966278. The application for that patent was filed on May 29, 1933. That patent shows one of the Alemite hydraulic fittings at 57. That was intended to show the serrated periphery of the orig-
461 inal hydraulic fitting. I got my information for that part of the patent from my knowledge of the Alemite hydraulic equipment; the Alemite hydraulic fitting, not the
257 coupler. In this patent we were devising a coupler for cooperation with it.

(Patent 1,966,278 is marked for identification as Plaintiff's Exhibit 54.)

I have a copy of the Paul patent.

I have here the Butler model marked Defendants' Exhibit A-61. I have here a piston part which comprises a cup leather here forming part of a piston corresponding
462 with 45 in Fig. 2 of the Butler patent drawings. It comprises a metal base portion for that piston element corresponding with what is marked 43 in the Butler patent. In this grease there is a metal washer which clamps or

assists in clamping the cup leather between the metal base part and the head of the more or less rivet part corresponding with the piece marked 47 in the Butler drawing. In the same here of this exhibit there is a generally cylindrical portion of the piston member extending forward from the base portion. And that cylindrical portion is cut with slits extending down substantially to the base portion in defendants' model. I have divided that cylinder into seven sectors or segments by means of seven slits. As to why did I put in seven slits there, making seven sectors instead of three, for example: The patent
463 specification reads "a plurality of fingers mounted on a base." I took that No. 7, instead of 3 to develop the amount of springing that the fingers require in the Butler structure.

Q. Now in all the other figures of the Butler patent where segmental jaws of any kind are shown there are only three, are there not, as, for example, in Fig. 9
258 there is an indication of three jaw-like members, is there not, one shown in elevation here, and then the other two preferably equi-distant, spaced around, and the one shown at the bottom of the drawing.

A. The drawing would be the same if there were seven, as a matter of fact. Just any uneven number of fingers the drawing would show the same as when it would have the elevation—. I don't know how many fingers or jaws are intended for Fig. 9.

Q. Isn't it obvious that three are intended because one is shown at the top, one in just the position in which
464 another one of three would appear, and if there were seven you would see at least two more in that figure, if the drawing were made accurately, wouldn't you?

A. Yes.

Q. That shows three, Fig. 9?

A. Yes.

That is what a mechanically trained man would understand from his knowledge of charts and from his understanding of that drawing.

Q. Now similarly the drawing of Fig. 4,—well let us take Fig. 3, those both represent an odd number; you can't tell whether it is three, or five, or seven or one.

A. That is correct.

Q. That is true of both 3 and 4, and it is true of 2 also, isn't it, you can't tell with certainty whether there

are,—well, you can't tell as to whether there are two or four or five or three or seven. You can't tell what number different from 2, can you?

259 A. Only that it would probably be even numbers of fingers in the drawing shown as 2. That is because both sides are shown in section; whereas if that were an odd number, why then the one through the slit
465 would appear in elevation as does the jaw in Fig. 3—the opposite one in cross section. Now if a section were taken through the jaws that is, through the finger parts instead of through the line of the slits, then two fingers would appear fully in cross section as they do in Fig. 2, and regardless whether the number be even or odd. That is, if I could find a place for sawing through, or in imagination sawing through the cylinder so that I didn't go through the slits then the segments would appear if the drawing were accurately made, cross-hatched as they are in Fig. 2.

Q. Now you say you put in many slits, that is seven, in order to get much flexibility in your fingers?

A. The extent of flexibility as required to function as Butler has explained.

Q. Well if you made only three slits you wouldn't have any where near the same degree of flexibility with the same thickness of material?

A. Not with the same thickness of material.

You would have a channel formation there and it would
466 be stiff. It is my understanding, taking the Butler patent drawing of Fig. 2 and the description which at one place refers to spring fingers, that the physical thing shown in that Fig. 2 corresponds with my representation of it in Defendants' Exhibit A-61 in respect of this forwardly extending cylinder from the large base part of the piston member as a whole.

260 Q. And that forwardly extending cylinder part is slitted a greater or less distance from the forward end?

A. In this case it is slit to the base.

Q. I know in this case it is, and there is nothing about the Butler patent that shows exactly how far those slits shall run, is there?

A. Except the lead line from numeral 42 of the patent shows the—in fact 42 is referred to as spring fingers in the specification and the lead line runs high up on the finger or about midway between the point at which the

member 51 contacts the inside of this finger when the 51 member is all the way back.

467 If the slits ran all the way from the forward end of the small cylindrical part back to the base part, then grease pressure when applied to the coupler would ooze out, be forced out back of the sealing disc 51 and through the slits into the outside of the cylinder in which the sealing member is located and then out to the outdoors. We corrected that difficulty in our model. We did that by inserting a second cylindrical sleeve within the outer one in which we cut our slits. The secondary cylindrical sleeve is on the inside of the spring fingers. In making our 468 model we put one in there. There is none shown in the Butler patent. We could not make the model operate if the grease would leak out through the spring fingers. And so one way to prevent that difficulty was to put in this lining cylinder. That is what we did.

Q. Now another way in which that could have been done would have been to regard these slits as extending not so far toward the base part of the piston mem- 261 ber, isn't that true? That is, if you cut the slits, say, only half way from the forward end to the base part of the cylinder then the grease would not have leaked out through the slits, would it?

A. The grease would not have leaked out, no.

Plaintiff's Exhibit 30 appears to be a fair representation of a general outline of this piston element of the Butler patent, with its cup leather 45 and its base part 43 and the washer 44 at the back, held together by the 469 hollow rivet 48. In this Plaintiff's Exhibit 30, a piece of rubber, not accurately but in a general way, represents the end sealing member 51. Now if the slits be carried all the way from the forward end to the base portion, then upon the slightest movement of that sealing member in a forward direction, why, you have got an opening wherever a slit is through which grease can leak out. Now if the slits were carried only half way, say, from the forward end of the small cylindrical part to the base part then the end sealing member 51 could move, oh, quite a considerable direction to effect the seal, with fittings of varying lengths and so on, without leakage through the slits, assuming that member 51 retained its shape. Now instead of constructing our representation of Butler with a cylinder having the slits extended only part way to the

base as, for example, in this Plaintiff's Exhibit 30 model,
470 we chose to run our slits all the way to the base in order to secure a degree of flexibility or yielding as suited to the purpose of the function of the Butler model. We were not anxious to secure the utmost of flexibility. We wanted whatever was required, no more. What we have here I should say shows the extent that we thought flexibility, springiness was required.

262 Q. You got so much there that you can with this tool steel piston, just with a pinch of your fingers, you can see the flexing of those spring fingers, can't you? See, when I pinch?

A. No, I don't notice any appreciable movement.

Q. Well, watch the slit there now. Do you see the slit narrow?

A. On one side they come in just a trifle.

Q. Now, if you had made this thing in accordance with the drawing of the Butler patent in respect, in in-
471 serting that inner cylinder within the 42 cylinder, then if you had made the slits of a length such that you wouldn't get this leakage out under the end sealing member, you wouldn't have had as much flexibility, as much yield as you do have in the model as you made it, would you?

A. That is right.

Q. Now despite such flexibility as you have been able to incorporate in this model, the fact is, is it not, that upon the forward movement of the piston member of Butler there is a tendency to compressively clutch these segmental jaws about the fitting, isn't that true? If you will watch as I push, you will see the jaws or the segments are all separated about a sixteenth of an inch away from one another, are they not?

A. Yes.

Q. Assuming that the grease pushes this piston member forwardly, as I do with my fingers, there is a tendency, is there not, to push those jaws together so they will compressively clutch about the fitting?

263 A. The tendency is to position the segments beneath the head of the fitting. As to whether the But-
472 ler patent describes them as being compressively clutched: page 2, line 101 reads:

"A plurality of segments 40 slightly spaced from one

another are adapted to slip over the head 38 and embrace the slot 39. The shoulder 41 on 38 prevents the retraction of these segments 40 due to the fact that they are held in position on the throat by the spring fingers 42, a plurality of which are mounted upon a base 43" and so forth.

In other words, they are positioned rather than clutched, from that description. Claim 2 reads, "for com-
473 pressively clutching the elements upon the nipple." Regardless whether one takes the description of the claim or this part of the description just read, in accordance with my understanding of the Butler patent, the pressure of the grease when it moves the piston member forwardly will move the jaws inwardly, or tend to move them inwardly, to a limited extent. The extent to which they are moved inwardly or forced inwardly will not, assuming the grease pressures are equal, and other things are equal depend upon the stiffness or yieldability of these fingers into which the little cylinder has been slitted; because the drawing, Fig. 2 of Butler shows the point of the spring fingers on one side at least in contact, or approximately so with the extended flange of the segment 40. When that end of the finger comes in contact with that flange of the segment 40 the piston assembly, including the spring fingers, cannot advance any further, and the spring fingers function as a column rather than a yielding member inasmuch as there is no
474 more camming surface or bevel surface to force the
264 segments 40 towards the throat of the fitting. As translated into the physical thing, (Defendants' Exhibit A-61) when the piston has moved so far forward that the end of the piston strikes the flange of the jaw perpendicular to the axis of the device, then it can't go any farther and can't do any more pushing, except that one end of the spring finger touches here the extended jaw.

Q. In making this you didn't make it so the thing could push all that way, did you; the jaws come completely together before the piston moves up that far, don't they?

A. Yes, approximately so, there might be a trifle forward movement left in the piston assembly after the jaws are together or the segments are together or the slits or

the segments are closed together there might be a trifle movement left of the piston forward before the end of the spring fingers contact the end of the segments.

(Noon recess.)

475 265 Exhibit A-61 has now been taken apart, the segments removed and the piston removed.

Q. You have out here now the piston member of your Defendants' Exhibit 61 with the outer end of the small cylinder at the top and the cup leather at the bottom on the desk, and I have laid the three segmental jaws with-
476 in the embrace of the outwardly beveled or flared end of the piston member, and I have here the fitting which constitutes a part of this Defendants' Exhibit 61, and I am going to bring the segments and the fitting together as in the act of slipping or pushing the segmental jaws of the coupler part over the head of the fitting part. Now, as you have made this apparatus, the slipping of the jaws over the head of the fitting is represented by my bringing these things together as I do, is it not?

A. Yes, with the notation that the three segments raise as the head of the fitting is forced through them.

Q. Now, you have made these things of a size such that the bore or hole through the jaws is such that a very slight outward, radially outward movement of them is required in order that they may pass over the head of the fitting, have you not?

A. They are made so that there is a movement required in order to get the segments over the head of the fitting.

477 The disclosure of the Butler patents is of an arrangement in which the jaws are normally so close together that the coupler cannot be slipped over the head of the fitting without a radially outward movement of the
266 jaws. The springiness of the forward end of the little cylinder of Butler then presses the jaws inwardly about the throat or groove of the fitting, when the coupler is attached. After that latching has occurred by slipping the jaws of the coupler over the head of the
478 fitting, the spring fingers 42 are relied on to position the segments 40 beneath the head of the fitting. When the grease pressure is applied that little cylinder, referring to the spring fingers 42, position the segments 40 beneath the head of the fitting so that the coupler cannot be re-

479 tracted from the fitting. When I say it positions them, I mean that the spring such as exists in the fingers 42 presses the segments toward the neck of the fitting. If that member 42, as shown in the Butler patent, were just a plain cylinder without any slits, and if it were pressed forwardly by the grease pressure. it would force the jaws inwardly so as to compressively clutch the throat of the nipple. I have been demonstrating what I said with Plaintiff's Exhibit 29 and the associated jaws marked Plaintiff's Exhibit 31. If the member 42 of the Butler be slitted, as indicated in Plaintiff's Exhibit 30, the application of grease pressure in forcing the cylindrical
480 member forward tends also to compressively clutch the jaws about the throat of the fitting. That is true regardless of how many slits there may be and regardless of how long they may be and regardless of how stiff or how weak each of the spring fingers may be. That is true regardless of how far the slits may be cut in the forward end of the cylinder, but the wedging action would still force the segments toward the center. That is to say, there is a wedging action between the beveled forward end of the member 42 and the jaws regardless of how stiff or how weak the spring fingers may be. When I speak of the wedging action, I mean what might otherwise be termed the caming action involving the movement of the one beveled surface to the other beveled
267 surface as between the spring finger member and the jaw members.

481 Q. Now, when the Butler patent refers, as it does in claim 2 to the "radially movable locking elements carried by the cylinder coacting with the nipple and actuated by said piston for compressively clutching the elements upon the nipple," it refers to the compressive clutching which is bound to take place regardless of how stiff or how relatively weak the spring finger may be made, does it not?

A. I would say that there is a limitation to what the word "clutching" means as disclosed in the drawing, Fig. 2.

Q. And what is that limitation?

A. The fact that after the points of the spring finger elements 42 touch the projecting flange of the segments 40 there can be no further clutching.

Taking again the segmental jaws of Defendants' Exhibit A-61 model: if the piston member is pushed forwardly with sufficient force to bring the sharp forward end of the part 42 into engagement with the flange at the periphery of the jaws, then no further force upon the piston will exert additional force inwardly upon the
482 jaws. The spring fingers cannot exert effort inwardly any longer. But up to the point at which the mechanism reached the limit of its operability in that regard, whatever force may be applied by the grease to the piston, will cause a correspondingly inward force to be exerted by the jaws about the neck or throat of the fitting, in proportion to the strength of the spring fingers. Now, the stiffer you make the spring fingers the more force can be applied to clutch the jaws around the throat of the nipple. And the weaker you make those spring fingers the less force they can apply before the limit is reached.

268 Q. Now, for some reason in this model which you have made these spring fingers seem to be sprung outwardly at the forward end. Do you see the generally tapered formation there? Take it in your own hand if you prefer.

A. I don't detect anything by the eye there.

The Court: Do you mean it bulges a little at the top?

A. There might be a trifle there, your Honor. It would take a micrometer to tell.

483 Using a ratchet micrometer, I take it up as far as the ratchet spring, and let it go each time. I bring it up both at the bottom and top so as to have the same force, both the bottom and top. I get a diameter of .812. Now
484 I take it up with the ratchet in the same way and get .790. That's 22 thousandths inches difference. I do not think that I purposely gave that element that outward flare toward the forward end, because it would be difficult to make a part incorporating that flare. As to how that flare got into it, that has probably taken some set in the handling of it. It works in the way that I demonstrated with that flare. It would work that way without that flare. It would work just the same regardless of whether the flare be there or not. The flare might give it a little less movement in positioning the jaws, segments 40.

485 Q. Now, is this not what you did, didn't you yourself do this, or have someone go at it and by flaring this thing and giving these things just the right diameters, as for example the head of the fitting, so that your device would slip, just barely slip with a little pressure over the fitting and so that the jaws would be sprung inwardly by the spring pressure so as to grip slightly the head before any grease pressure was applied?

A. No. What you say is not the case since I recall the shop details from which this part was made will, 269 I am quite sure show the finger portion straight.

I think it would work just the same whether that was straight or flared as it is. I don't think that more than 2 hundredths of an inch difference in diameter would affect the operations. We cannot take out the sealing member in this member, because it might be destroyed. At any rate, when I unscrew the part into 486 which I have incorporated the spring fingers from the base plate, then we see extending forwardly from this base plate, an inner cylinder which is not slitted and into which I have set our sealing member. And in adding to this inner cylinder in which I have mounted the sealing member I secured a great deal more yieldability in our spring finger member than if I had continued the slits only part way from the forward end to the base. I added this innermost cylinder in which I mounted the end seal 51 to what is shown in the Butler patent to permit the end seal member that comes in contact with the head of the fitting to function and hold the grease pressure.

Q. Now, if you had cut your slits only part way from the forward end to the base, as in this Plaintiff's Exhibit 30, you would have had an arrangement in which 487 the end seal would function, would you not, in the way described by Butler?

A. It depends upon the extent to which the slit is carried along the length of the spring finger and the extent to which the sealing member can work down along the inside of the spring fingers as a result of the pressure tending to force the sealing member 51 against the head of the nipple.

Q. Well, you could have put in a slit only part way from the forward end of the cylinder 42 in such a way

that the end seal 51 would be operative in the way described by Butler, could you not?

A. Butler does not describe the way that end
270 seal operates. It is difficult to answer that question.

Q. He says "The washer 51 provides a ready means of adjusting the junction of 38"—that's the fitting, is it not?—"with the remainder of the mechanism and effectively seals the connection so that the lubricant will pass through 48 into 52 after having pushed back the rivet or stud 36", the rivet or the stud being the valve in the end of the fitting?

A. Yes.

Q. Now, it would have worked in that way, would it not, if the slits had been carried only, we will say half way from the forward end of the cylinder 42 to the base?

488 A. There is a probability that the sealing member would work under those conditions, could be made to work.

When the patent says that the purpose of this washer 51 is to provide this ready means of adjusting the junction, I understand that to mean that the sealing member will be pushed by the grease a little way out, or farther out, as may be necessary tightly to engage the head end of the fitting member, so that the mechanism will accommodate, itself to variations within reason of the dimensions of several fittings. One may be a little longer or a little shorter or a little fatter or a little slimmer, but whatever those variations may be within reason this end seal will independently adjust itself to the position at the end of the fittting, so as to make a tight joint no matter what, within limits, or within reason those variations may be.

489 Q. Now, do you have any question still that the construction of the Butler patent is one in which, upon the application of grease pressure, that the jaws will compressively clutch—or will be compressively clutched around the throat or groove of the fitting?

271 A. Compressively clutched with the limitations that I have outlined.

Q. You mean within the limits of probability it will do that, do you?

A. To the extent of the springiness in the fingers and the position to which the spring fingers travel, that is,

after they contact the flange with the segment 40 they don't exert any further clutching action.

Butler intended that the thing should be operated in that way, that the fingers come up against the flange so that they don't do anything further, after the segments
90 have been positioned beneath the head. It can be deduced from what is seen on the drawing in this wise only, that if you make the fingers sufficiently yieldable, then they can be pushed and spread up until they hit the end and there they will stop, whereas if you make them stiffer then as they are pushed forward they won't slide up far enough to hit the end and stop.

Q. Well, now, do you think that Butler necessarily meant that those fingers must slide up until they hit the end every time?

A. There was no disadvantage in the event they did.

Q. Well, there was no disadvantage in the event they did not, was there?

A. No. Whether they did or did not come in contact was not of major consequence in so far as the design and function of the coupler was concerned.

Q. It is not of any consequence, is it?

272 A. It is, yes, of this consequence, that in the event the pressure behind the piston was such that it would force those points of the spring fingers against
91 that flange with the segments 40, then that no further inward clutching could be brought about.

Q. Then the whole seal, the whole joint might burst asunder under sufficient pressure, might it not?

A. I would suspect that that would happen, yes.

Q. Whereas, if you make the fingers strong enough so that under any pressure you are going to employ they won't go up all the way to the end, why, then the higher the grease pressure the tighter the clutch, is not that so?

A. With sufficient stiffness in the spring fingers or using a solid cup, yes.

Q. That all means, if you want to have a maximum pressure of a thousand pounds per square inch you could use spring fingers that would have only a certain strength, and that strength would be sufficient to push the jaws in and hold them against the grease pressure, hold the whole mechanism together against the grease pressure, does it not?

A. In so far as clutching the segments about the fitting is concerned, yes, sir.

Q. And if you want to use grease pressure running up to 10,000 pounds per square inch, then, by making the fingers stiffer you could still apply that grease pressure
492 and the grease pressure will push the piston member forward without striking the end, so that up to 10,000 pounds per square inch the higher the pressure the tighter the clutch, is not that so?

273 A. That is true by making your spring finger a solid cup, or the equivalent.

Q. How solid? Just solid enough so that they will transmit the requisite force, that's the whole story, is it not?

A. Yes.

Q. Now, is not it within a man's ordinary skill and understanding, in reading that Butler patent, that he would give those fingers a stiffness that is sufficient to prevent the coupler from being burst asunder from the fitting under any grease pressure you wanted to use whether it be 1,000 or 10,000 pounds per square inch?

A. Yes, provided he at the same time made provision for withdrawing the coupler from the fitting.

There is difficulty about making it so that that can be done, because if instead of spring fingers you employed a solid cup, then, there would be no manner by which the segments could move laterally to permit clearance for
493 the head of the fitting to be withdrawn from them. That is, if you have an unslitted, and therefore a solid member 42 of Butler, as in this Plaintiff's Exhibit 29, and the grease pressure forces the jaws together as I have done here with the jaws of Exhibit 31, then I say that upon the relief of the grease pressure there is no way to get the coupler off the fitting.

Q. Well, is not it a fact that if you merely pull, or push a little and then pull, that with no grease pressure on the piston that those jaws will separate in such a way that you can pull the coupler off?

A. I would say they will not and I cannot reason of any manner by which they would, as shown in the
274 Butler drawing. I get the equivalent of that situation when I force this brass ring over the spring fingers of our Exhibit 61. This brass ring is tapered at
494 the inner end, in such a way that as one pushes that over

the flared outer end of the spring finger element one squeezes the outer end of those fingers together very slightly.

Q. Well, you squeeze them together enough so that instead of having the outward flare of 22 thousandths of an inch they have not outer flare, is not that right?

A. Well, they position themselves to the inside diameter of the brass sleeve.

Q. That looks to me, as you look at the slits, as though that brass ring squeezed them together enough so there is not outward flare to the fingers, is not that so?

A. Well, it is just tight enough so that the fingers are held snugly within the brass ring so that there is no springy movement, but I can turn the cylinder with my hands.

Q. When you put the brass ring on there you contract the outer ends of those spring fingers inwardly about
495 22 thousandths of an inch, don't you?

A. No, I would not say it was 22.

Q. How much?

A. I cannot very well say, but I imagine there is still some clearance between the inside diameter of the cylinder and the outside diameter of the fingers close to the base of the fingers. It contacts them in some way but very slightly.

Q. Now you say that when that brass ring is on there and when therefore you have eliminated the yield-
275 ability of the spring fingers, that then you cannot remove the coupler from the fitting of the construction, or in the construction shown in the Butler patent, is that right?

A. I don't think I said cannot. It is possible to get it off. That is done by working the coupler off the fitting so that the piston member made up of 42, 43 and 45 and 44 can be forced toward the back of the chamber 50 in order to provide a clearance between the beveled surface of the jaws or segments 40 and the beveled end of the
496 spring fingers to provide a clearance there so that the segments can move radially over the head of the fitting. If the piston assembly was moved back into that clearance, as shown at 50, then, the coupler could be withdrawn from the head of the fitting. Butler shows no provision for bringing that action about, nor manner by which it can be done. Butler shows sufficient clearance to accom-

497 plish the removal of the coupler from the fitting in the way just described. The Butler patent says, beginning in line 23 of page 3 of the specification: "As soon as the pressure is relieved it is then possible to withdraw the coupling from the member 35 as the pressure on the fingers 42 will be relieved and the spaced segments 40 will slip over the shoulder 41 due to the pressure of 33 against the ends of the several segments 40". It is not true that that operation could occur just as it is described there regardless of whether the fingers 42 be made completely stiff or whether they have more or less yieldability about them. It is not true in the case of a rigid cup instead of spring fingers, because by merely releasing the pressure in the coupler, as he outlines, does not mean that the piston will change its position. It is free to change it, if
498 276 there is some means provided by which it can be changed. My idea is that the operation of the gun will not literally suck any grease out from behind the piston, and, therefore, the piston will stay where the grease has pushed it. On the other hand, if you bring any pressure, no matter how slight, on the forward end of the piston element, by wiggling, it is possible after a fashion to force the piston assembly back to secure enough clearance between the segments 40 and the head of the fitting to withdraw the fitting. In order to be able to withdraw
499 it in that way it is important to have clearance at the back of this piston 45 in the manner shown in the Butler Fig. 2. No matter how yieldable or how stiff the fingers may be, they do have compression by the wedging or caming action, maybe more or maybe less, that part of it depending upon the stiffness of the spring fingers. But no matter how stiff or how flimsy so far as yieldability is concerned, so long as they are springy they will transmit some force by wedging action. When Butler speaks of "compressively clutching the jaw element upon the
500 nipple" he means, as I understand it, such compression as he secured because of that wedging action as developed by the spring fingers.

Q. And when he speaks, as he does in claim 1, of the action of the pressure of the lubricant, and not I quote "to forcibly compress said means", that means, does it not this forcible compression of the jaws about the throat of the nipple by wedging action, as you understand it?

A. Well, as he says, according to what you have read here "will move the piston to forcibly compress said means". That forcible compression means the force-
277 ible compression which resulted from the cam action of the spring fingers and the segments. I probably have called it heretofore a good many times "wedging action", in a loose sort of a manner. When I spoke of it as "wedging action" I have meant the same thing as I now, perhaps better describe as caming action. I have
501 used the terms interchangeably. I would not say they mean the same thing: a cam does not necessarily mean wedging. I have used the term "wedging" to mean the same as I have now described as camming action.

Referring to line 14 of the Butler patent on page 3 where it says: "Returning to Fig. 2 and its operation, it will be understood that the coupling on the end of 25 is thus pushed over 35, the segments 40 engage with the throat and are maintained in engagement by the pressure being greater on the piston within the coupling than any relief of the pressure that will be possible through the passage of the lubricant through 48", I understand that to refer to this camming action or wedging action, or
502 the result of that action between the spring fingers and the segments. The total length of the little cylinder 42 of Defendants' Exhibit 61 apparatus is approximately 33-25/32nds of an inch long, from the under-side of the hex shoulder. This cylinder that I have added inside of the spring finger element, as shown in Butler, is approximately 17/32nds of an inch long from the under-side of the cup leather. When I put the small inner cylinder inside of the cylinder 42, as shown by Butler, the spring
503 fingers project more than a quarter of an inch from the end of the spring fingers, about 3/16ths I should say, as close as I can read. The slits back to this inner cylinder are about $\frac{3}{8}$ths—about 25/64ths of an inch. Looking at the scale it is approximately $\frac{3}{8}$ths of an inch; if anything, a few thousandths over that.

504 278 I now compare the Paul Patent with Claim 2 of the Butler patent, as written out and divided into its elements by Mr. Williams: The first element, "a headed nipple for receiving lubricant", in the Paul patent is the headed nipple, the member 10.

Q. Of course that is not described as for a lubricating system, is it? A. hose coupler.

A. That is the caption on the patent, yes.

Q. Then there is nothing about lubrication in there, in this patent?

A. I haven't looked at the full patent. I am not sure.

The next element of claim 2 is "a lubricant compres-
505 sor". It is to be assumed that pressure is involved, by reason of the fact that that is what warrants the coupling. I haven't read the Paul patent with that thought in mind, to search out that.

The element, "a headed nipple for receiving lubricant", in Butler is this piece 35, 38, and 39. The lubricant compressor in Butler is this thing shown in Fig. 1. As to the third element, "a coupling member for connecting said
506 compressor and nipple comprising"—the cylinder in Paul is made up of parts 15, 18 and 17. That is the outer shell of the complete affair as shown in the lowermost Fig. 5. "the cylinder" of this claim in the Butler patent in Fig. 2 is made up of parts 31 and 32. I mean to include the part in which 45 reciprocates. It does not seem to have any special reference letter, but it all seems to be included under number 31.

279 Q. The next thing in this claim is "a piston movable within the cylinder, and having an aperture for the discharge of lubricant thereof." In Paul, "a piston moveable within the cylinder, and having an aperture
507 for the discharge" of something would be the member 22.

Q. The whole of that?

A. The yielding part acts as a piston. It is movable.

Q. Well, looking here at this Fig. 5, just what part of that constitutes the piston movable in the cylinder? All of it?

A. No, the part beyond that which is clamped over the periphery of it is clamped between these two parts of the cylinder shell. All beyond that I rate as the piston. The piston that is referred to in the Butler patent, I find as the members 43, 45 and 44. The member 51 of Butler is not the piston in the same sense as is the member 22 of Paul, because it functions as a sealing seat in Butler, whereas in Paul that same seat is the very end of the
508 member 22. In Butler the piston functions to operate this machinery whereby the jaws are pressed in. As to whether there is anything like that about Paul: The reaction of the pressure against the member 22 of Paul

causes a tightening of the pawls or spring fingers, in this case No. 20. In Butler when this piston 44, 45 and so forth, is pushed forwardly by the grease pressure, the forward beveled ends of the spring fingers bodily move the jaws inwardly, or tend to. And in Paul there are some latches here intended to be operated by one's fingers, and springs that snap them into position. Paul has spring parts marked 21. The 21 holds the part 20
280 in position. The finger pieces that I take hold of and press together in order to disengage the one part
509 from the other, are marked 20. In Paul there are these springs that snap those latches down behind the shoulder here. As the pressure of the water in this hose pipe is turned on, the sealing member 22 will act like a gasket to tighten and seal the joint, and in so doing the pressure will act against the ends of the spring latches. That is the way in which it functions. This gasket member 22 has the function of compressively clutching or forcibly engaging, doing all the things that Butler ascribes to his piston mechanism for effecting the mechanical gripping of one part to another. The pressure brought against the member 22 intensifies the gripping.

The next element set forth in this Claim 2 is, "an apertured sealing seat carried by said piston for engagement with the end of the nipple, connecting the piston
510 aperture with a passage through the nipple." In the Butler patent, the apertured sealing seat would be the member 51. In Paul the equivalent is the tips of the piston member 22. I speak of it as the tips only, because if that is not sealed initially, if the very tip doesn't seal, then the balance of it will not seal, because the grease would get in at the end and simply push the surrounding rubber away from the nipple within it. The material that the gasket or that the piston is made of, would be pushed away. That would be leather, in Paul, from the appearance of it. Rubber or leather would ordinarily be
511 used for a gasket, in a situation of this kind. When I say that it is only the tips of that that I regard as the apertured sealing seat, it is true that the pressure of
281 the water within this pipe coupler or hose coupler acts along the entire conical face of this sealing member 22 so as to push it in against the coupler throughout the whole of the contacting area. That is something to be named the piston of the claim and some other part

of that same identical piece of leather or rubber as the apertured sealing seat of the claim. I think the sealing is accomplished by the very tip of the member 22. As
512 I read the claim on Butler, I find in this one thing 22 the two elements of the claim, namely, the piston and the apertured sealing seat. The Paul patent describes that one thing as merely a washer 22.

Q. So that what Paul called a washer has the function or the functions that you have described and constitutes the two elements of this claim, that is right, isn't it?

A. The claim as I read it has no two separate parts, but it does not say whether the two elements are embodied in one or in two parts.

The next thing in the claims is "radially movable locking elements carried by the cylinder coacting with the
513 nipple", and those in Butler in Fig. 2 are these parts 40.

The claim goes on to say, "and actuated by said piston." That is, actuated by this piston 45 in Butler.

Quoting, "for compressively clutching the elements upon the nipple whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said elements while the lubricant is passing through said connecting parts." That describes, as I understand it, the actuation of these locking jaws 40 by this piston 45 to do the things described here, with the result that
282 the pressure of the lubricant upon the piston will move the piston to forcibly compress these jaws while the lubricant is passing through.

Turning to Paul, the radially movable locking elements carried by the cylinder is part No. 20 carried by the
514 cylinder parts 15, 18 and 17. Those coact with the nipple by latching in behind the shoulder of the nipple 10.

Butler claim 2 reads, "actuated by said piston". As to what actuation of those things 20 there is by this washer 22 of Paul, there is the reaction as a result of pressure against the member 22 tending to force the nipple 10 out of the coupling member. Those things 20 are simply spring latches which as the two coupler parts are pushed together spring in behind the shoulder there and then they stay right there. Whatever force there may be upon the part of the water or liquid within this coupling to force the parts asunder is resisted by that
515 pawl-like latch. The latch is pivoted here to the outer shell in about the center of its length. A little spring

tends to hold it inwardly. Its action is in a longitudinal direction, mainly, from the pivot to the end of the pawl. That action of those latches tending to prevent these parts from being burst asunder, would not all occur regardless of whether the washer 22 is present or absent. The extent to which the members 20 engage under the shoulder of the nipple 10 depends upon the pressure exerted against the member 22. As the pressure increases the tendency to move under the head is intensified.

283 Q. Supposing in Paul you just took out this washer 22 entirely and simply give to the flange here near the end of 10, that is between 10 and 12, approximately the same diameter as the inner bore of the shell, and it is practically so in the Paul patent, isn't it?

A. The high part of the cone is closer to the idea of
516 a cylinder than the small end. If I left out that packing washer 22, or gasket, I would get a little or more or less leakage of water out between 10 and 18. If I had this connected in a garden hose and turned on the water there would be a whole lot of water go through that connection, without 22 in place. If one had a nozzle or sprinkler at the end of the hose there would be whatever pressure the water system might develop within that hose tending to render the whole coupling inoperative because of leakage. It would leak some, but a whole lot of water could easily go through and would go through, assuming that a lot of water is going through there under pressure.

Q. Then it would do all that, wouldn't it, without the
517 washer 22? It would simply be a leaky hose connection.

A. You would get some water through the center. Of course your area around the circumference around the head of the nipple 10 is quite larger than the hole through the nipple 10. I have seen garden hose with a lost gasket, squirting a little water out of the joint. Still a lot of water goes through and goes through under pressure despite that leakage. In Paul's garden hose coupler, you would get some through and lose some water, or grease, or whatever happened to be passing through.

284 Q. Yes. Now, to the extent that water develops pressure within the hose and the coupler, these spring latches 20 would latch the one part to the other in just the same way and with just the same action regardless
518 whether the washer or gasket 22 is present or absent, isn't that so?

A. Not in just the same way, no, because that means that if the member 22 is present the full pressure developed in the coupling member is available to intensify the holding action of the members 20.

As to whether that is so regardless whether 22 is there or not there, except for the fact that the leakage perhaps would reduce the pressure a little in the hose line: The higher the pressure the more the members will tend to grip the nipple. If you have one hundred pounds of pressure in that hose line of Paul, there will be a certain force tending to disrupt the one part from the other, and that might be a pressure of fifty pounds tending to dis-
519 rupt the two. If it is half an inch in area then there will be fifty pounds of force tending to separate the two. That would be exactly the same regardless whether washer 22 is present or absent, except that if the gasket or washer 22 was not there why it wouldn't develop that pressure, not this one hundred pounds. If I assumed it, I could have one hundred in both cases. If you have the one hundred pounds pressure you get the same disrupting force regardless whether the washer 22 is present or absent, and the reaction on this little spring latch is bound to be the same under that one hundred pound pressure.

520 285 Now, when in Paul you want to separate the two parts of the coupler, you take hold of these spring latches and press them together and in that way release the latched means and pull the two parts of his hose apart.

In the Ulleland patent discussed in my direct testimony, there are the spring actuated latching pawls, that latch under the head of a part of a quick-acting hose coupler. If you slip the one part into the other and the
521 latches latch, then regardless whether the gasket be present or absent, if you have a given pressure of one hundred pounds per square inch in the hose line, the reaction of these spring latching things will be just the same regardless whether the gasket is present or absent.

I found in this little garden hose gasket here at 7 in Ulleland all these co-acting parts of Butler, the piston actuating the jaw element, and so on. In Ulleland when I want to separate the two parts I get at the coupler here with my hands and bring the latches together and
522 they unlatch and I pull the hose apart.

Pinel is of the same character.

524 Mr. Williams has drilled a hole through the cylinder

with a punch drill and into the part marked 45 of defendants' wooden model A-60 and into those drilled holes pushed a couple of brads, in such a way as to make the part 45 rigid and in effect integral with the cylinder part. So that now we have the coupler part of this wooden model embracing the fitting part of the model with the jaws in place corresponding with the position in which I began my demonstration of it in direct examination.

525 286 Q. Now, I wish you would take again this same Claim 2 of the Butler patent and see whether you do not find in this Butler model in which I have put the piston 45 and everything associated with it out of business insofar as any mechanical movement is concerned—and that is what I have done, have I not? I didn't nail it as tight as it could be nailed, but we can assume that it is motionless.

A. The piston does not move with reference to the cylinder.

Q. All right. Doesn't this claim 2 still read on that Butler model, thus put out of business insofar as the piston part of the mechanism is concerned, that is the piston 45 is concerned, in just the same way that you read it on Paul, and as follows: You have, "The combination with (1) a headed nipple for receiving lubricant." That headed nipple is still here, is it not, in this model?

A. Yes.

Q. Next, "of a lubricant compressor." That is here somewhere we will assume.

A. Yes.

Q. Three, "a coupling member for connecting said compressor and nipple together," and that is the whole
526 of the coupling part as represented in this model, I take it?

A. Yes.

Q. "—comprising a cylinder." Now in this case, first let me ask you, if there were the hole through here—you have got it filled up with a stick, but it is intended to represent a hole going through 31 here and through the piston 45 as you have made it, isn't it?

A. Yes.

287 The grease could go right through that hole of the coupler part and into the hole in the fitting part and then come through, as Mr. Williams has nailed it together. We have a cylinder comprising this part 42 in

the same sense that we have the outer shell of Paul comprising what I call a cylinder. In other words, I have got the cylinder here in which is located the sealing gasket or washer of Paul or Ulleland or Pinel, for that matter. Going at it a little differently, there is still here in Butler, even with the piston mechanism put out of business, the gasket or sealing member 51. That is made
527 and arranged in such a way that the pressure of grease coming through here will act on the back face of that gasket to press it toward the head end of the sealing member, so that it would prevent leakage.

Q. That being the case, is that not a piston movable within the cylinder, and having an aperture for the discharge of lubricant thereof, in precisely the same way in which you found in Paul a piston movable within the cylinder?

A. The sealing member would still be movable within the cylinder within the spring fingers. In the sense in
528 which it is found in Paul, there would still be in this member 51 in Butler, a piston movable within the cylinder, having an aperture for the discharge of lubricant thereof; substantially so.

Taking the next element of the claim, "an apertured sealing seat carried by said piston for engagement with the end of the nipple, connecting the piston aperture with a passage through the nipple." I find that in this Butler model with 45 nailed home in just the way that I found it in Paul.

288 Q. And when you come to the next element, "radially movable locking elements carried by the cylinder coacting with the nipple and actuated by said piston for compressively clutching the elements upon the nipple whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said elements while the lubricant is passing through said connecting parts," you find that all there in this wooden model or exemplified in this model with the 45 nailed to 31, just as you found those same things in Paul, do you not?

529 A. Would you mind letting me read that?

Q. Yes. Just check that.

The Court: Does it follow the language of the patent?

Mr. Williams: Exactly.

Mr. Haynes: I found two or three errors in it.

Mr. Williams: You did? Well, that is the pain of having stenographers doing work for you. Let us get it and check it here. What did you find, Mr. Haynes? Yes, Mr. Haynes is right. Where it says "Upon" it should read "On." "Move the piston to forcibly," it should say, instead of "forcefully."

530 A. It requires some little thought to get all of the points. "Radially movable locking elements carried by the cylinder coacting with the nipple," would be in the case of Paul the members 20 and in the case of the model as you prepared it here I don't find just what they would
531 be. The segments wouldn't co-operate or wouldn't coact with the nipple inasmuch as there would be no movement in the rigid fingers.

Q. Neither is there in Paul, is there, after it is once put together? There is no movement?

A. Well, but Paul gets a reaction from the pressure against the member 22 which tightens against the members 20.

288½ In this nailed up Butler I get a reaction of the same kind. That is, there is grease pressure in here behind your gasket 51. That grease pressure is tending to push the fitting in one direction and the whole coupler in the reverse direction, and that is resisted by these locking elements 40. It is they which hold the one part from being pushed away from the other. That all cor-
532 responds "Whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said elements while the lubricant is passing through said connecting parts." The word "coacting" with the nipple I question, inasmuch as "coact" would mean to be able to uncouple as well as couple, and in this model as you have it here it would be impossible to uncouple.

Q. Because there are no spring handles or no handles that you can take hold of and get the lockers out of the way, isn't that the reason?

A. There is no possible way to get the segments 40 over the head of the fitting.

Q. Of course in this wooden model there is a way to do that. Just pick them right out of there. Isn't there?

A. Yes.

Q. There is where the wooden model is better than the real thing. But if in some way they could be gotten

out of the way there, as Paul gets them out of the way, by hand, why then you can separate the parts, can't you?

A. Yes.

533 289 Q. That is the only respect, isn't it, in which this Butler when you have emasculated it by removing the piston 45 and its function and it co-operative relationship with the cylinder, that is the only respect in which it differs from Paul, eventually, is it not?

A. Let me see just one other point. "The radially movable locking elements carried by the cylinder coacting with the nipple and actuated by said piston." If the piston in the wooden model is locked to the cylinder I don't quite find how it could actuate the locking elements.

Q. I agree with you. That is the point which I am talking about.

In Paul the only piston that I have is the sealing washer, and when I read the claim on Paul that is the piston. When I read it on Butler with the emasculation of the piston cylinder I can read it in the same way on the sealing element 51, so that becomes the piston.

Q. And when the grease pressure comes in behind
534 this thing 51 of Butler, and which you now call the piston, why then you get the same kind of a reaction against the latching member as you have in Paul, don't you?

A. But how does this piston compressively engage the locking elements?

Q. That is the point. It doesn't. Neither does it in Paul, does it?

A. Well, it does under Paul in that it intensifies the locking element.

290 When I put the piston and the cylinder 45 out of business in Butler I have the same thing as in Paul, except with the rigidity that I have gotten in this model I can't get the things apart or together easily.

Q. Now, let us take the other model where they are springy, corresponding with the springiness of Paul, and I don't know whether it is necessary to go through it all. It won't take but a moment, perhaps. Let us have that drill again. You know quicker than I how to get those things out. Will you get those things out of there?

A. I can't very well do it with the piston like this.

Q. You had another one here.

Mr. Williams: What is the number of this?

Mr. Ahlberg: 60.

535 The Witness: I witnessed Mr. Williams, in this Defendants' Exhibit A-59, nail the part 45 and so forth to the cylinder. With these springs in here we have got something like Paul's spring latches. That is, it can be slipped together just as Paul's parts can be pushed together. Then when the grease pressure acts on the back of 51 it tends to push the fitting away from the coupler, or, looking at it conversely, it tends to push the coupler away from the fitting, action and reaction. And in doing that the latching member here bears against the shoulder of the fitting, and holds it with some force which, however, can be overcome to pull the things apart.

536 291 Q. Now, if you take this Claim 2 and read it in the way in which you read it on Paul, finding in this gasket member both the piston and the sealing seat, why then you have that all in this Butler model even though the part 45 of Butler be fastened permanently to the cylinder in which Butler shows it to reciprocate, don't you?

A. "radially movable locking elements carried by the cylinder coacting with the nipple and actuated by said piston,"—I am not clear as to how that actuates the—it is actuated by the piston as intensified. "—for compressively clutching the elements upon the nipple whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said elements while the lubricant is passing through said connecting parts."

Q. Now, it seemed to me that you were reading Butler's claims in the way that you have just said in order to apply them to Paul and to Ulleland and to Pinel, and so I have drawn up here a picture or duplicate of Fig. 2 of the Butler patent, and I would like you to see if this isn't so, except that I have omitted the piston,

537 part 43, 45, 44, and simply made all of that integral with the back of the cylinder. Now, with that arrangement you can read Claim 2 of Butler on this emasculated Butler drawing in the same sense in which you read it on Paul and Ulleland and Pinel, can you not? In other words, you have got in this drawing, haven't you, what in effect we had by nailing up the model, the wooden model?

292 A. It hinges upon the spring finger element. In the first wooden model I understand you agreed that you couldn't uncouple with the spring fingers fixed, rather with the fingers fixed and rigid.

Q. Well, you didn't bring in the uncoupling when you read the claim on Paul, did you? You did not say anything about the way in which Paul had to be gotten apart by manual operation of these pawls, did you, in your direct examination?

A. That doesn't appear in the claim of Butler. The
538 same thing is true of Ulleland both of them show very explicitly means for a hand operation of latching mecha-
539 nism in order to get the things apart. I didn't disregard that in discussing Paul and Ulleland, to my knowledge. Claim 2 of Butler doesn't have that in it.

Q. Now, therefore, when I ask you to read claim 2 in the same sense that you did read it on Paul and Ulleland, and so on, why do you say that unlatching means is not present in my drawing?

A. Because the claim reads "radially movable locking elements carried by the cylinder coacting with the nipple." My understanding of the word "coacting" is that it is such a locking element as will permit of coming off and going on the fitting.

Q. Do you think that claim 1 by its language or otherwise means both locking and unlocking under the actuation of the piston mechanism which is described, do you?

540 A. Yes. Locking and unlocking is what I understand claim 2 of Butler to mean either in words or by implication. There is the distinction that claim 2 does not describe Paul, because in Paul the unlocking is not by any piston but it is by a separate hand manipulation.
293 The same thing is true of Ulleland, and of Pinel.

This drawing of the emasculated Butler was marked for identification as Plaintiff's Exhibit 55.

Mr. Williams: And while we have that here, Mr. Fox, I wonder if we couldn't just put on my Butler, in the Butler emasculated form, the reference numerals corresponding with the parts of Paul as you say they are present here, namely, on this fitting part here the numeral 10, and on the latching part the numeral 20, and on the cylinder part the numerals 17, 18 and 15, and on the
541 part which in Paul you call both the piston and the apertured sealing seat the numeral 22.

Now, all my letters or numerals there correspond with the Paul parts, do they not, as you understand them?

A. Yes.

Q. Now we are agreed about this, are we not, that it is only when you eliminate from the Butler claim the arrangement whereby the thing which in Butler is called a piston for effecting the actuation of the locking elements, both for locking and unlocking, that you are able to find what they say is the Butler invention in Paul and Ulleland and Pinel, is that right?

A. In strictly passing on that Butler claim, yes.

Q. When on the other hand if you have regard for the Paul automatic or semi-automatic use, whichever term you prefer, when you have regard to the fact that in Butler this piston is movable within the cylinder, does the work of locking or gripping or clutching the coupler to the fitting and upon the release of the pressure releasing that grip or clutch, having regard to that part of the Butler claim as stated or implied, that you do not have in any of these prior art patents to Paul, Ulleland or Pinel, isn't that so?

542 294 A. I find it difficult to answer yes or no to that. We do not have the same piston in Paul and Ulleland in the same shape that you have it in Butler.

Q. Nor performing the same function, isn't that so?

A. The Paul and Ulleland require the fingers to be moved manually.

In Butler the piston does all of that semi-automatically: positions the segments 40 under the head of the fitting.

Q. That means that if you give to that language of Butler the meaning which it has as disclosed in the Butler patent, and the meaning which you say should be implied as a result of it, then you don't have that thing in either Paul or Ulleland or Pinel; isn't that so?

543 A. You don't have the function of the piston moving the jaws in the fashion they do in Butler, in Ulleland or Paul.

Referring to this copy of claim 2 of the Butler patent again, and looking on the one hand, at the drawings of the Butler patent, and on the other hand at this drawing, Plaintiff's Exhibit 34, of the Alemite hydraulic system or equipment: This claim 2 of Butler calls for a "headed nipple for receiving lubricant," that is the 35, 38 and so forth in Butler. In the Alemite hydraulic on this chart

it is marked also 35. Such a headed nipple for receiving
544 lubricant is equally present in both.

295 The next element of that claim is "a lubricant compressor having", and that is shown in Fig. 1 in Butler and at the place marked with the numeral 1 in Plaintiff's Exhibit 34.

The next element of the claim is "a coupling member for connecting said compressor and nipple comprising". Both have a coupling member for connecting the compressor and the nipple. As to where the succeeding elements are present in both. The claim calls for a cylinder. In Butler that cylinder is the one, the larger one in which 45 slides, the one that does the functional work of actuating the jaws, the grip and release. The cylinder then is this outer cylinder. In the Alemite hydraulic that could be the cylinder, the outer cylinder in which
545 the part 45 reciprocates. I should say they compare as close as you can make a comparison.

The next element is "a piston moving within the cylinder and having an aperture for the discharge of lubricant thereof,"; that is the piston comprising 43, 45, 44 and so forth in Butler. In the Alemite hydraulic it would not be this piston having the V leather marked 45 which reciprocates in this cylinder which I pointed to. The piston is not movable within the cylinder because the claim reads "a piston movable within the cylinder, and having an aperture for the discharge of lubricant thereof," the aperture of the piston in Exhibit 34. That is true under Butler, the lubricant is discharged through the aperture of the piston. Under Exhibit 34 the lubricant is discharged through the sealing member and the
546 aperture in the piston has the sealing member in it.

296 Q. Well, there would be as though, in Butler if we continued this sealing member back farther in the piston, wouldn't it, that is what you have?

A. You would have to extend the sealing member of Butler all the way through the piston to arrive at what is shown in Exhibit 34.

(Mr. Williams takes up a hollow piece of pipe.)

Q. Here, referring to 48 in Exhibit 34, what you have got in the Alemite hydraulic is something that I can simulate here when I make a ring with my thumb and fingers, representing the piston, and then within that there is a sliding sealing member which is tubular in

form, is there not, to correspond in a way with this brass ring?

A. That is evident from the drawing.

Q. Well now, the difficulty which you have in finding this element in claim 2 in the Alemite hydraulic coupler is because the element of the claim says that this movable piston shall have an aperture for the discharge of lubricant thereof. You have, do you not, a piston with a hole through it? No difficulty about that, is there?

547 A. No.

Here is the piston and here is the hole through that piston of a diameter substantially of the inner hole in the V leather packing.

Within that hole in the piston there is a sealing member which in turn has a hole in it, so that the grease goes through the inner hole, of the inner parts.

Q. At 48, and while, like my red pencil, the grease goes through the smaller hole from one side to the other, you doubt whether it also goes through the larger hole which is around the smaller one; isn't that the way of expressing your difficulty about that claim?

297 A. The wording does not read on Exhibit 34 in the manner which it reads on Fig. 2 of Butler.

In Butler the grease goes through the role in the piston first. Immediately afterwards it goes through the

548 hole in the sealing member. In the Alemite hydraulic it goes through the hole 48. While going through the smaller hole in the sealing member 48, it is also going through the larger hole in the piston.

Q. Now in that degree you do have, don't you, in the Alemite hydraulic this piston movable within the cylinder and having an aperture through which the grease goes or, as it says, having an aperture for the discharge of lubricant thereof?

A. Well, the aperture in the piston 34 serves another purpose in Fig. 2 the grease actually comes in contact through the aperture of the piston.

In the Alemite hydraulic the aperture in the piston serves as a support for the inner sealing member.

Q. Guides or supports it?

A. Supports it.

In the Butler it is supported independently of the hole through the piston; that is the difference. Here is a

549 piston with an aperture through it, and there within that

aperture is a sealing member which in turn has an aperture through it, the pipe, and in the Alemite hydraulic the two things are more or less in the same transverse plane; whereas in Butler the sealing seat is moved out a little way from the face of the piston; there is a difference. As to whether that is the whole difference, I am not sure; it is difficult to visualize Butler sealing member extending all the way through his piston.

298 Q. You don't have to do that. You have got that Alemite hydraulic, you see a piston with a hole through it in which the sealing member is mounted for movement, and in turn with a hole through it and, therefore, you agree, I take it, that there is the aperture in the piston of the Alemite hydraulic and that the grease is discharged through it; it goes through it from one
550 side to the other, doesn't it?

A. I can't say other than the grease goes through the sealing member 48 which in turn seats in the piston 45.

Now the grease is on this side of the piston.

Q. Somehow it gets from here to there, and the only question is whether it goes through an aperture and through the pipe within the aperture; is that about it?

A. I am, of course, trying to read the wording of the claim, not what the drawing shows.

Taking the next element, "an apertured sealing seat carried by said piston for engagement with the end of the nipple".

Q. Then that in the Alemite hydraulic is what? I will say it is such an apertured sealing seat, that is 48, isn't it, with a hole through it?

A. That would be the equivalent, yes. That moves relatively to the piston forward and back a little. It engages with the end of the nipple at this spherically con-
551 toured forward end. It doesn't connect the piston aperture with a passage through the nipple, it connects the aperture through the member 48 with the passage through the nipple.

299 Q. Well, that is the same thing again, whether the grease is going through a hole within the pipe with a hole, it goes through the last hole; it is the same thing, isn't it?

It says, this apertured sealing seat, and that is this 48, carried by the piston. There is no doubt as to the engagement of the end of the nipple and it does make a

connection such that the grease can get from one side of the piston to the other and into the fitting?

A. But it doesn't connect the piston aperture with the passage through the nipple, because there is no grease that goes through the piston aperture that flows to the nipple. No grease that contacts the piston aperture in the piston and flows through the nipple in the sense that it does in Butler.

552 300 Q. If in Butler you simple made that sealing element with a neck that came back to a larger hole in the piston you would have something like the Alemite hydraulic, wouldn't you?

A. Well, you could change the Butler to correspond.

Q. It would then act in the same way to accomplish the same result, wouldn't it?

A. I am not sure of that.

Q. Now, taking the next element of the claim it says "radially movable locking elements carried by the cylinder", reading only so far; where then, did you find in the Alemite hydraulic these things marked 40 on 34?

A. These jaws you have marked 40.

They have a radial movement, coupled with their slight fore and aft movement. They are supported by
553 the cylinder. Butler is carried by the cylinder and the hydraulic, I should say, is carried by the cylinder.

"coacting with the nipple". In both cases these radially movable locking elements or jaws coact with a nipple. In both cases they are not actuated by the piston.

Q. Well, are they in Butler?

A. Yes.

Q. Whereas the actuation in Butler by the piston they are skewed inwardly and compressively clutched inwardly to forcibly engage about the throat of the nipple, aren't they?

A. By the piston, yes.

Q. In the Alemite hydraulic coupler of this Exhibit 34, and as exemplified also in the large model 33, when the piston is forced forwardly here under the pressure of grease coming through from the gun, these jaws are pushed outwardly, are they not, into the conical end of the shell or cylinder. Maybe you would like to take this in your own hand and see that.

554 301 A. I can see that the conical jaws are moved towards the center of the fitting by the beveled interior

of the end of the cylinder. In the Alemite hydraulic couplers the jaw extends from the extreme forward end of the coupler back to a point here where the rear end of each jaw is engaged by the element 45 which I call a piston. In the Alemite hydraulic, piston 45 directly engages the rear end of the jaw or locking element; contacts 45 on the jaw. When the coupler is applied to the fitting and grease pressure is then applied back of the piston, that piston is not pushed forwardly by the grease pressure, because instead the cylinder moves backward and the piston is held in position against the end of the fitting.

555 Q. That is this old action and reaction again?

A. I don't know.

The rear end, as it is called, of the coupler is connected with a compressor of lubricant, and then when the coupler is connected with the fitting the compressor can be operated to develop grease pressure back of the piston in the coupler.

Q. Now when grease pressure is developed within the shell or cylinder of the coupler back of the piston, why, there is a tendency of the grease pressure to push the piston forwardly and the cylinder backward, isn't there?

A. No, the first tendency is to move the cylinder back.

Q. Well, I am talking about before we get to that. I am talking about the pressure being equal in all directions throughout a body of liquid under pressure, hydrostatic.

A. That is true.

556 302 Then we have the lubricant within that space under pressure and acting equally in every direction to burst itself out of its confined space. That means a thrust on the piston in this direction toward the forward end, and a thrust on the cylinder backward, except that the backward thrust is exerted over the full area of the interior of the cylinder whereas the thrust in this direction or towards the nipple, is exerted against a more limited area comprising the surface of the piston, and the balance of it fortunately exerted against the tubular member that comes in contact with the fitting. That is why the grease goes in the fitting. When the fitting is in a bearing and if it were clogged up so grease could not

flow as you apply pressure, then all of the forces developed by the pressure are necessarily balanced in a forward direction and a reverse direction.

Q. Otherwise, the thing would walk off somewhere,
557 wouldn't it? All right. They are unbalanced only to the extent that the grease overcomes the check valve in the fitting and moves into the bearing, is that right?

A. You are speaking now after the coupler is on the fitting, or what?

Q. Yes.

A. There is grease pressure back of the piston within the cylinder.

Q. In the Alemite hydraulic that grease pressure acts on the piston,—I am not talking about movement, but it exerts a force on the piston in the direction toward the forward end of the coupler, doesn't it?

303 A. After the fitting is in the coupler, yes, then pressure comes on. That is when pressure does come on. It is that grease within there under pressure that also exerts pressure on the real wall of the cylinder of the compressor tending to push that away from the fit-
558 ting. If the sealing member here within the piston is up against the end of the fitting, as it will be when the things are brought into juxtoposition with one another, my proposition is that the piston cannot move bodily forward with respect to the earth, but rather that the force at the rear end of the cylinder will push the cylinder back. If the fitting is fixed in position with respect to the earth, and an initial attachment is made and then the compressor operated to develop pressure, the effect will be to move the cylinder of the coupler backward a little bit and in so doing to get this compressor grip about the throat of the fitting.

Q. On the other hand, if we fix the coupler rigidly to the earth and bring the fitting up to it and I am still holding the coupler part rigidly with respect to the earth and we operate the compressor, then the tendency is to push the fitting a little away from the coupler, isn't it? It is
559 relative movement that counts; can't we agree about that?

A. No, there is a difference in principle between—

Q. Something more than that?

A. —between the two actions.

560 304 Proceedings of Tuesday, April 21, 1936.

Q. At the close of session yesterday, we were comparing the Alemite hydraulic system with claim 2 of the Butler patent and we had gotten to the part of the claim which reads "radially movable locking elements carried by the cylinder coacting with the nipple and actuated by said piston." You had said that in the Alemite hydraulic system there are radially movable locking elements carried by the cylinder and coacting with the nipple but you said that they were not actuated by the piston if
561 I understand. That is correct, is it not?

A. Yes.

In the Alemite hydraulic system the jaws are actuated by the movement of the cylinder rather than by the piston. It is my idea that in the Butler patent the cylinder stands still and the piston moves, whereas in the Alemite hydraulic system the piston stands still and the cylinder moves. In both cases there is a relative movement between the cylinder and the piston; the one moves with respect to the other. In both cases it is that relative movement which brings about the actuation of the locking jaws. The difference between the movement of the piston in the case of Butler, and the movement of the cylinder in the case of the Alemite hydraulic system, is not a mere matter of reversal. Instead, there is a vast
562 difference in principle. In the scheme shown in the Butler patent the jaws look somewhat like those of this Plaintiff's Exhibit 29 but are up against the end of the cylinder which is perpendicular to the axis. The beveled surfaces of those jaws are engaged by the in-
305 wardly beveled surface of the slitted inner cylinder of Butler. When the grease pressure is applied to the back of the piston assembly, those beveled surfaces at the forward end of that piston assembly wedge or cam the jaws radially inwardly in the manner indicated with this Plaintiff's Exhibit 29, to the extent of the limit of the strength of the slit fingers. In the Alemite hydraulic system the forward end of the cylinder, instead of form-
563 ing a surface perpendicular to the axis of the coupler forms a surface which is beveled. The Alemite hydraulic inner bore of the cylinder is beveled. That could be represented by the forward end of the inner cylinder of

Plaintiff's Exhibit 29 when turned over as Mr. Williams now turns it over. We have now something which is a conical caming surface corresponding with the conical camming surface at the forward end of the cylinder or shell of the Alemite hydraulic coupler. If correspondingly the direction of these same jaws that we had as representative of Butler, is reversed, then the relationship between the camming surfaces of the jaws and the conical camming surface of the cylinder is the same as it is in the Alemite hydraulic system, considering this exhibit we are working with as stationary and not moving either one of the two component parts.

564 Mr. Williams: I call your attention to Plaintiff's Exhibit 33, which is the enlarged aluminum model of the Alemite hydraulic coupler. I have had Mr. Wupper tie the spring back here as you see so that the parts are more easily movable by hand.

306 A. In the Alemite hydraulic system as exemplified either in the aluminum model here or as shown in the drawing, the forward contacting surface of the piston assembly insofar as it coacts with the jaws is a surface perpendicular to the axis of the coupler. That corresponds with this perpendicular surface of the jaws removed by Mr. Williams from Butler's Exhibit 29 and reversed, considering the sealing member going straight through the center. In this piece of Plaintiff's Exhibit 29 is a piston assembly in which the forward end, in-
565 stead of being beveled as is shown on the Butler patent, is perpendicular to the axis of the coupler.

Q. Now, if we bring this perpendicular forward face of this reversed construction into contact with the perpendicular back face as it now is of the jaws and push on the piston as would be done by grease, why, the jaws are actuated so as to move radially inward, are they not?

A. Yes.

Q. Now, in so far as that is concerned, that is true also in the Alemite hydraulic coupler, is it not, that is, you have a conical outward surface here for the cylinder, you have jaws with a conical forward surface corresponding with the reversal which I have made of the Exhibit 29, you have the back end of the jaws perpendicular to the axis in both cases, you have the engaging surface of the piston in both instances perpendicular to the axis, do

you not, and you have a situation in both—well, maybe you had better answer that.

A. No; because in the demonstration you have just made with Exhibit 29 you pushed forward on the piston
566 member, whereas in the model of the Alemite coupler the cylinder moves back to actuate the jaws toward the center of the fitting.

307 Q. Can't you agree that what I have just said is true?

A. If you will not go into the matter of movement.

Q. All right. We have it still here. When it is standing still—I won't touch the parts—when it is standing still you do have exactly the correspondence that I have pointed out, don't you? You have on your outer cylinder in each instance a conical camming surface?

A. Yes. On the forward ends of the jaws in both cases there are reversely conical camming surfaces, here in the reversed Butler model and here in the Alemite hydraulic model. In both cases the rear face of the jaws is perpendicular to the axis, right here. In both cases the forward end of the piston assembly which actuates the jaws is perpendicular to the axis of the coupler. Tak-
567 ing the reversed parts of the Butler arrangement and pressing the piston toward or in the direction toward what would be the nipple if present as would be done by grease pressure back of the piston, we have the radially inward movement of the jaws.

Q. Similarly, it is true, is it not, that if I press the piston of the Alemite hydraulic coupler forwardly, as would be done by pressing, that we have radially inward movement of the jaws?

A. That is not true because you cannot advance the piston of the Alemite model forward because of the fact that it encounters a shoulder of the sealing member which in turn is in contact with the end of the fitting, therefore, the cylinder must move back as the result of pressure within the body of the coupler.

308 A. Well, there is a slight freedom for movement there between the piston member and the jaws, is there not in the Alemite hydraulic, you can see it here, can you not?

568 A. The model is very loose and flexible. If you refer to Plaintiff's Exhibit 34 it shows the piston tight against

the shoulder of the sealing member, indicating that the piston cannot move forward toward the clamping jaws because of that shoulder.

Q. Well, the drawing shows also a clearance between the piston and the sealing member, does it not

A. There is between the nut on the sealing member and the back-wash of the piston, yes.

Q. That allows for a movement of the piston relative to the sealing member, does it not? There is clearance there in which movement can occur?

A. There is clearance by which the piston apparently might move back. However, it is shown tight against the shoulder of the sealing member. There is a clearance so that the piston can move relative to the sealing member. This particular drawing, Plaintiff's Exhibit 34, shows the coupler in association with the fitting, and in the situation in which the fitting is compressively en-
569 gaged by the jaws of the coupler.

Q. Now, supposing the picture showed the coupler before the engagement of the fitting, then we would have a situation, would we not, in which the forward movement of the piston member would push the jaws into the conical rings at the end of the cylinder and cause them to move radially inward?

309 A. There might be a possibility of that if the fitting was not in the end of the coupling and the pressure was put on to the cylinder.

Q. Yes. Now, it is your idea, as I understand it that when the Alemite hydraulic system—Have we got the nipple part—when the coupler is first slipped over the head of the nipple and then grease pressure is applied, that the relationship between the nipple and the piston and sealing mechanism will be such as I indicated here by a movement, a bodily movement of that inner mechanism of the coupler within the cylinder, is it not?

A. No. I cannot find that there would be movement of the sealing member or piston after the fitting is in place in the coupler.

570 Q. I say that it is your idea, is it not, that after the coupling mechanism has been slipped over the nipple mechanism that the longitudinal relationship between this jaw mechanism and sealing mechanism of the Alemite hydraulic coupler remains fixed with respect to the fitting?

A. Yes.

It is my idea that when the grease pressure comes on, since the nipple is attached to an automobile, and therefore not easily movable, that the effect of the grease pressure will be to pull the cylinder somewhat (as Mr. Williams illustrated) to pull the cylinder back away from the nipple. The reason for that is that when the grease pressure is developed in the space between the piston and the back end of the cylinder, it will tend to separate the back end of the cylinder from the piston.

310 If now the piston through the intervening mechanism has a fixed position or relationship with respect to the nipple, and the nipple itself is rigidly at-
571 tached to the automobile, then the relative movement between the piston and the cylinder will occur by a backward movement of the cylinder rather than by a forward movement of the piston. It is because of the relative movement of the piston and the cylinder in the Alemite hydraulic system that I regard the cylinder as moving, whereas in the Butler patent I regard the piston as moving.

Q. Well, it is for that reason, is it not, and for that reason only that you say that the Alemite hydraulic system does not have in it radially moving locking elements which are actuated by said piston.

A. That is not the only reason. There is a vast difference in principle.

Q. Would it be true of the Alemite system to say that it has in it radially movable locking elements carried by the cylinder coacting with the nipple and actuated by said cylinder, instead of said piston, for compressively
572 clutching the elements upon the nipple?

A. That would not be consistent with the further wording of the claim which states that the piston moves—

The Alemite coupler has the movement of the cylinder for compressively clutching the clamping elements against the fitting.

572 311 If, in the Alemite system we were to screw the nipple into, we will say, a very light and tiny baby carriage so it would be very easily movable and pushed, and if then we were to make the initial connection of the coupler with that nipple in that little baby carriage, and if then we were to hold the coupler part very rigidly

with respect to the earth, fasten or bolt it down, and then apply the grease pressure, in that case as the grease pressure came on there would be a slight forward movement of the piston mechanism taking with it the nipple and the baby carriage too.

573 Q. In that case you would have, would you not, just what the claim of Butler calls for, namely, radially movable locking elements carried by the cylinder coacting with the nipple and actuated by the piston for compressively clutching the elements upon the nipple?

A. In this model Exhibit 33 in the way it functions I am unable to account for any forward movement of any of the piston elements even though the coupler is held rigid.

Q. Now, the pressure on the piston is in the forward direction in the Alemite hydraulic under the baby carriage assumption, is it not?

A. Yes, but the piston again comes in contact with the shoulder of the sealing member.

Leaving that out of account, the net final result is that those locking elements or jaws compressively clutch the nipple element more tightly when the grease pressure is applied to the back of the piston than they did before.

574 312 Q. Is not it true in this baby carriage assumption that in the Alemite hydraulic system you would have exactly what Butler describes here, namely, radially movable locking elements,—you have already said they are present, you have already said they are carried by the cylinder, you have said that they coact with the nipple. Now, the one remaining thing is this, are they not under the baby carriage assumption actuated by said piston for compressively clutching the elements upon the nipple?

A. Yes, that is true except that Butler did not design for the baby carriage situation, he was designing a fitting that was to be applied to automobiles.

It is probably true that the Alemite hydraulic mechanism is the same regardless of whether the nipple be screwed into a heavy automobile or whether it be screwed into the axle of a very light baby carriage. I have never seen one screwed into a baby carriage.

As to whether the mode of operation of all the Alemite hydraulic mechanism would be precisely the same, regardless of whether the nipple be screwed into the light

575 baby carriage or into the heavy automobile: It would be

located in the same manner. All the mode of operation would be the same, the relative operation of all the parts would be the same.

576 Finishing up with the balance of this claim 2 of the Butler patent: the claim goes on to say, "whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said elements." That is not true of the Alemite hydraulic in its normal operation. It is true if the nipple be screwed into the light baby carriage and the coupler be held rigidly in position with respect to the earth, so that the baby carriage can be pushed away rather than jerked toward the coupler.

577 313 The claim goes on to say, "while the lubricant is passing through said connecting parts" that would be the time at which the baby carriage is pushed away while the lubricant is passing through, thereabouts. When the pressure comes on, the first thing that would happen would be the baby carriage would be pushed away 1/16th of an inch or 1/8th of an inch or thereabouts. And, if on the other hand the nipple were screwed into a heavy automobile and the coupler were held in one hand or at the end of a flexible conduit, in that event the nipple would stand still when the grease pressure came on and the whole outer shell of the coupler would move backwards 1/16th or 1/8 of an inch. That's the difference. But in so far as the relative movement of the parts and the stresses and strains set up between the parts of the Alemite hydraulic coupler and nipple, they would all be the same whether we had the baby buggy situation or

578 the automobile situation.

579 There were shop drawings provided for the building of the Butler model, Dft. Exh. A-68. I have not got them here. I have made a search for those and was unable to locate anything other than the chart 24. The chart was probably made after the device had been made. I don't recall definitely. I furnished the machinists or mechan-

580 ics with some drawing of what I wanted made and they made it and experimented with it and when they got through, then, the chart drawing was made.

314 The shop drawings were made in the shop. It may be they were working on this drawing before the model was ever completed. This chart 24 was made after the model was made.

581 In the case of this other chart, 21, the Exhibit A-61

device was made first, and the chart was made afterwards.

Referring now to the Pinel French patent and particularly the translation of it, Dft. Exh. A-70, the translation reads:

582 "In order to effect the junction, socket C is screwed on part *a* of tube A, in such manner that the joining ring E is compressed between the extremity of part *a* and ring D, the latter being maintained in its screwed on condition by flange c^1 of socket C; this ring D now being rigid and set into one of the grooves *b*, tube B is firmly held and cannot separate from tube A, the connection being perfectly tight."

583 That is the only description of the manner in which the two coupler parts are brought and attached together, as far as I can find at the moment. If I find anything else about it at any time I shall call attention to it on the record. The thing that is described there as screwing the socket C on the part *a*, is something that is done by hand. When it comes to the matter of unscrewing, described in the next paragraph, saying, "In order to effect dismounting, socket C is unscrewed to break off the tightening" and so forth, that paragraph describes a hand operation in unscrewing the one coupler part with respect to the other.

Turning to the next page next to the last paragraph reads:

"When inserting one part into the other, the half-rings move on under the pressure and fall back behind
584 each one of the flanges of the half-tubes which they thereby retain; the tightening produced by the screwing of the two nut screws compresses a compressible washer placed in the inside."

315 That does not refer to the manner in which the sealing of the joint is effected, nor is it described as being effected by this hand screwing of the parts together. I would say that that refers to bringing the yielding packing member E up against the, or in position with the tapered end of the fitting *b*. Where it refers here to the tightening produced by the screwing of the two nut screws, that screwing is done by hand, but it tightens a portion of the sealing member E around the outer periphery as is shown clearly in Fig. 1. At any rate, it is a hand operation that does that part of com-

pleting or making the joint between the two half tubes. What is described here in the translation as the "half tubes which they thereby retain" would, I should say, refer to *b*.

585 As to whether *b* shows a series of half tubes, I cannot answer without a further study of the patent description. It would take a little time for me to read it. If at any time I find out what that means, I shall volunteer. Maybe this noon I can study that out and have some suggestion.

Relative to this Pinel patent and the language of that patent which describes the operation of the mechanism, I have not read it with that point in view. That's what I was doing, reviewing it.

Q. Well, if you find anything further when you look it over this noon or any time relative to mode of operation, why, indicate it and I will give you a chance to answer that further. Now, one other thing relative to

586 this patent to Pinel, it does not describe by word or 316 sentence or reference of any kind, it makes no mention, does it, of the mode of operation which you ascribed to it in your direct testimony.

A. I mentioned that it should be shoved onto the fitting *b*, as I recall, from reading the claim.

I described a mode of operation and results in my direct testimony. I remember finding a piston and seal, and a seal for pressing up against the end of the nipple, and so on. There is no reference of any kind to any such mode of operation in the Pinel patent.

Q. Now, I would like you to turn to the Richardson patent. You testified in your direct testimony that this nipple, Dft. Exh. A-46, was made from the Richardson patent as your source of information, and you were asked whether you made it solely from the patent drawing and you answered by saying "Sólely from the patent drawing, yes." "Q. And specifications, I suppose?", and the

587 answer was "Yes." Now, I would like you to compare the fitting or nipple which you produced as Dft. Exh. A-46 with the drawing of the Richardson patent and say whether or not it is a fact that you have changed the shape of the thing shown in the patent in making your physical representation of it?

A. The exhibit is slightly smaller than the drawings shown in the patent. It is otherwise in proportion.

Q. Is not it true that in making your sample you gave the ornamental collar shown around the fitting in the Richardson patent a different shape from what it is shown there to have had?

A. No, I don't see that there is any appreciable difference in the shape.

317 I have here a photograph which appears to be an enlarged reproduction of the drawing, Fig. 1 of the Richardson patent.

(Said photograph is marked for identification as Plaintiff's Exhibit 56.)

588 I have here another photograph which on an enlarged scale accurately depicts the Exhibit D-46 which I offered as representative of Richardson.

(Said photograph is marked for identification as Plaintiff's Exhibit 57.)

589 I note now a composite photograph in which one photograph is printed superposed over the other. I see a duplicate there of a drawing of the Richardson patent, in white. Superimposed over that is a picture of the thing I presented, but I couldn't say that it has been superimposed as well as it may have been or might have been. The pictures of both are right there.

(This photograph is marked for identification as Plaintiff's Exhibit 58.)

Whatever similarities or discrepancies there are in contour or proportions are shown in that composite photograph; but the photograph of Fig. 1 has not been superimposed directly over the photograph of the fitting of the exhibit. In other words, the heads do not coincide.

590 The head portion of the exhibit member projects beyond the plane of the end of the head portion of the figure member. The thing that I produced here was of a size and a shape such that it would cooperate perfectly, as indicated in this large colored chart of ours, No. 18, with the Alemite hydraulic couplers.

318 Q. Now, isn't it a fact that you gave to your Defendants' Exhibit 46 the sizes and the dimensions and the shapes which would enable that cooperation to occur, and that you did so deliberately instead of making your sample solely from the Richardson patent, as you said?

A. The dimensions used were those, for the most part, in common use on grease receptacles, now in use.

Q. The first thing that you said in answer to the Court's question was that there was no function to these things of Richardson's to which you gave functions, and I mean by that the peripheral ornamental collar, and so on; they have no function, of course, as disclosed by Richardson, I think we are agreed about that?

A. Yes, there is no coupling member shown.

Q. That Richardson patent shows, does it not, in the
591 lowermost figure, the spout of an old fashioned oil can pushing down the ball valve in the top end of the fitting, so the oil can be ejected from the spout of the oil can into the body of the fitting.

A. That is not necessarily the spout of an oil can.

Q. What do you take it to be?

A. I find on line 52 it says, "The oil is fed into the cup by simply pressing the spout of the feeder (as shown in Fig. 3)", and then again at line 23, "the slightest pressure of the spout of an oil can or feeder".

319 Q. Well, do you think that those words are used alternatively or disjunctively; do they mean two names for the same thing or mean different things?

A. No, I should say that indicated two different things. I think the feeder is something different from an oil can. The feeder referred to in that patent of 1851 would imply pressure as a medium in getting the oil into the fitting through the feeder.

As to whether the drawing in Fig. 3 shows a feeder:
592 It doesn't clearly indicate just what it shows. The end of an oil can is customarily curved. That is what is shown here in Fig. 3, as I understand it; in view of the curvature I would say this particular view shows an oil can spout. There is no pressure in or about the delivery of oil from that spout or oil can in this Richardson oil cup. But I think when a feeder is used that there would be pressure.

Q. Oil pressure, grease pressure, mechanical pressure?

A. Fluid under pressure passing through. The spout of the oil can is pressed onto the ball valve mechanically to push it down. That is not the kind of pressure I am ascribing to Richardson.

593 I am not describing a manual pressure which would occur by pressing the ball down by the end of a com-
320 mon spout. I think that when Richardson says that his invention consists in providing the interior of the

oil cup with a valve which fits in a seat around the mouth and is held there by a spring serving to close the mouth of the cup and exclude dirt but yielding to the slightest pressure of the spout of an oil can or feeder, that the feeder is something that doesn't apply pressure in the same way as the spout of an oil can, but applies hydraulic pressure of oil; for the reason that he says, that is, the patent reads on line 55 referring to the ball valve, "which may or may not project above the mouth when closed", indicating that that ball valve can be positioned lower down in the opening so some other contacting means other than the spout of an oil can could be used, which he makes reference to as a feeder.

Q. He says here at the beginning of the paragraph to which you called attention, this is in line 52 of the specification:

"The oil is fed into the cup by simply pressing the
594 spout of the feeder (as shown in Fig. 3)".

So that the thing shown in Fig. 3 and which you think is the spout of an oil can is there described as being also, —or is described also as the spout of a feeder, is it not?

A. Well, Fig. 3 would not apply if, as he says, the ball valve was moved further down in the fitting.

Q. Let us talk about one thing at a time. I am reading the beginning of the paragraph at line 52 that reads:

"The oil is fed into the cup by simply pressing the spout of the feeder (as shown in Fig. 3) upon the upper surface of the valve."

Is that what you understand to be shown in Fig. 3, the spout of the feeder?

321 A. Fig. 3 shows a spout of a feeder which, however, does not limit what may constitute the spout of a feeder in the light of the specification.

Q. Now you said five or eight minutes ago that the thing shown in Fig. 3, in accordance with your understanding of it, was the curved spout of an oil can, did you not?

A. Due to the curvature I would say it was the spout of an oil can, yes.

Q. Then the thing shown there in Fig. 3 is both the spout of an oil can and the spout of the feeder, is it not?

A. No, I don't think that necessarily follows.

Q. Despite the fact that the specification says, right

after the word feeder, do you see it there in parenthesis, "as shown in Fig. 3."?

A. Yes, but further down—

Q. No, right there it says just that, doesn't it?

A. It says "spout of the feeder (as shown in Fig. 3)," however, the feeder is not limited to what is shown, or
595 the other reference to the spout of an oil can or feeder on line 24 does not hold.

Q. Well, if a feeder as shown in Fig. 3 is the feeder which the patent says is there shown, then there would be no hydraulic or grease or oil pressure in or about this Richardson construction, or patent from beginning to end, would there?

A. No, that wouldn't necessarily follow. There would be no likelihood of pressure.

322 Q. You mean that the joint between the spout of the oil can or the feeder would hold pressure at that
596 juncture, resist the escape of oil or grease under pressure?

A. It could be made to, yes.

Q. Not, could be made to, but is it disclosed that way in Richardson?

A. Not from the showing of Fig. 3.

Q. Well, or the whole thing taken together? Isn't it true?

A. It is possible, according to the specification of the patent for the ball to be located at a point lower down within the fitting, and the specification says at line 56: "when closed, the spring requiring to be only strong enough to hold the valve in place, yields readily to the pressure, and allows the valve to descend sufficiently to admit the oil to the inside, and on the feeder being withdrawn it raises the valve and closes the entrance."

Consequently, if it were contemplated positioning the ball low down in the fitting, the feeder would have to be long and tapered and could not be curved like the conventional spout of an oil can, therefore there must be
597 two types of devices required for injecting oil into the fitting.

As to whether, in making our sample of Richardson, I made the upper surface of the valve project above the mouth when closed, or so that it would not project above the mouth when closed: It was made in accordance with the drawings of the Richardson patent. As to whether

ours projects above the mouth there, I would say there is a slight projection which is noticeable when I bring the edge of this penknife over the projecting ball in the fitting, I can feel the surface of the ball.

323 Q. If it were a hundredth of an inch less high then it would not project above the surface, isn't that true?

A. I can't appreciate a hundredth of an inch. If it was slightly lower down it would not project.

Q. It would take the alternative that is referred to in the patent, wouldn't it?

A. One of the alternative forms. The patent doesn't limit the extent to which the valve can be lowered into the inlet hole.

598 Q. You did read a passage here referring to this valve as yielding readily to the pressure. That isn't intended to mean oil pressure or hydraulic there, is it?

A. As phrased there, that does not indicate clearly whether it is the pressure of the oil or the pressure brought about by contacting the valve with the oil cup spout.

Q. Now that is a part of the very sentence in which the mechanical pressure of the oil cup spout is referred to, isn't it? Let me call your attention to the first words of that sentence, it says:

"The oil is fed into the cup by simply pressing the spout of the feeder (as shown in Fig. 3) upon the upper surface of the valve."

That is simply a thing that everybody has done with an oil can in getting the oil into this valve hole, in a bicycle or sewing machine or any like piece of machinery, isn't it?

A. Yes. That is purely a mechanical push of a spout on the ball.

599 As to whether the sentence,

"The oil is fed into the cup by simply pressing the spout of the feeder (as shown in Fig. 3) upon the upper surface of the valve, which may or may not project above the mouth when closed, the spring requiring to be only strong enough to hold the valve in place, yields readily to the pressure."

means this pressing of the spout of the feeder: I 324 state not necessarily, inasmuch as he interposes there "which may or may not project above the

mouth". If the valve was considerably lower than the mouth you may not be able to touch it with the end of the spout and it may have to be opened by pressure from the feeder.

Q. Let us see your fitting here. If the valve were a little below the spout and you had a fitting of the size contemplated by Richardson you would simply stick the end of the spout right down in that hole, whether it is a sixteenth of an inch or a quarter of an inch, till it struck the ball, then push, and then get your oil in and then take it off?

A. Depending on the size of the hole and the size of the feeder.

600 Q. If they cooperate it would be done in just the way I described, wouldn't it?

A. There is nothing to show but what the cooperation may not take place against the edge of the hole on the feeder, then the pressure through the feeder unseats the ball valve without the feeder coming in contact with the ball valve.

Q. Conversely, there is nothing to show any such thing in Richardson?

A. Only the fact that he mentions the ball valve can be utilized lower in the fitting.

Q. Did you ever see the spout of any oil can that could be gotten into the tiny hole that you made in your exemplification of your understanding of Richardson?

325 A. I have seen some very small spouts on oil cans, whether they can enter that hole or not I don't know for sure.

Q. The spout of any ordinary oil can or feeder couldn't possibly be injected into that hole in the way shown in Fig. 3 of the Richardson patent, could it?

A. It may, a small oil can such as used on bicycles or sewing machines.

601 As to the classes or branches of the automotive trade to which Kleenseal N-6 nozzles had been sold, to the builders of new cars in the first place in connection with guns and to automotive service stations, and so on. This chart, Plaintiff's Exhibit 43, does not show how many were sold in each channel. This tabulation has nothing whatever to do with N-6 nozzles. In that regard, when

602 we sell one of our grease compressors there is one of our N-1 or N-6 nozzles attached to it in which it termi-

nates. It is always the custom to provide it with the needle nozzle, either N-1 or N-6. Now we furnish the N-6 nozzle attached to the equipment with an auxiliary countersunk cap. The auxiliary countersunk cap is furnished for the purpose of converting the N-6 which has the guide flange type of cap, to an N-1 nozzle. From the time we began to sell these things to the lubricating trade other than Alemite, I mean in 1933, the invariable custom was at the beginning to attach the N-1 nozzle to
603 the gun. That continued to be the custom, until,
326 I should say, approximately the time that the Kleenseal system was available, which included the N-6 guide-type nozzle cap and the Kleenseal fitting. From memory, that was about November 1934. After that, for a year after that at least, it continued to be our practice at attach the N-1 nozzle to the gun and then to supply as an extra an N-6 shell or terminal. We called that skirted affair a countersunk face cap. Our N-6 nozzle has a tubular member with an inturned skirt at the outer
604 end. That piece of metal is the N-6 nozzle, or nozzle provided with that type of cap is referred to as the N-6. We call that the cap.

Q. Now isn't this a fact, that month in and month out it was your general practice and custom for at least a year after November 1934, to supply all of your guns with an N-1 nozzle which was attached in operative position, and then to tie on as an extra or a supplement, one of these N-6 caps?

A. I think that is true to some extent. As to the length of time that was done, I am not prepared to say, and I am not prepared to say when and if we attached the N-6 cap as an extra. The N-1 nozzle with the countersunk face cap went out attached to lubricating equipment for some time after the Kleenseal system was completed in September 1934. I may have carried the impression in my remarks just previously, may have carried the impression that the N-6 nozzle was put on equipment just the moment it was available; that was not the case.

Q. No, nor for a long, long while afterwards, isn't that true?

605 327 A. I don't know just how to gauge a "long, long time."

Q. Well, it wasn't done for a year, was it?

A. I can produce papers or instruction sheets to es-

tablish that. It is my recollection that it was done at such time as we had the distribution of Kleenseal fittings requiring the use of the N-6 nozzle. I don't know from memory when that would be.

These guns of ours, or compressors, have been sold to garage men or service stations or individuals, anybody that we could get to buy them. Their sales have not been confined at all to manufacturers of automobiles for export into foreign countries.

Q. Nor to the dealers engaged in the sale of the cars to whose manufacturers you have sold your Kleenseal fittings, they haven't been limited in that way at all?

A. We are speaking now of the nozzle?

Q. Well, your compressors with the nozzle, with the
606 N-6 nozzle. There are dealers who sell the Oldsmobile, for example; other dealers who sell Buick cars, other dealers who sell Pontiacs: we have sold our fittings to the manufacturers of those several cars. We haven't confined our sales of N-1 nor N-6 nozzles to any of this class of people. We have sold them to everybody that would buy them, and including those dealers.

Q. Well, insofar as they would buy them, but a lot of those dealers have not bought them, have they? The Cadillac dealer in Chicago uses an Alemite hydraulic coupler in his service station in Chicago, doesn't he?

607 328 A. No, I do not know about it. I don't know about James Levy who handles the Buick distribution in Chicago, or in the Chicago territory. I don't know whether he uses Alemite hydraulic gun and coupler in his service station; nor Cadillac of Evanston. The dealers in the cars to whose manufacturers we sell Kleenseal fittings would use Alemite hydraulic couplers and compressors in their servicing stations.

I have here a copy of the British Griffin patent No. 16086 of 1904.

608 As to how that operates, the member C is screwed by the member B. The whole attachment of the part C to the cock, it seems to have no number; that is done by a hand screwing operation just at the point of coupling. The uncoupling is simply a hand unscrewing motion; it is accomplished by taking the clamp member A off the head of the fitting E after unscrewing, yes.

609 (Noon Recess.)

610 329 I do not have any figures or data relative to the date and number of my company's Lincoln guns or compressors equipped with Lincoln Kleenseal nozzles of the N-6 kind which were sold by us to the automobile manufacturers to whom we sold our Kleenseal fittings. I can't give any information right at this moment as to how many were thus sold.

611 As to a number of prior art patents showing pieces of metal of one kind and another with heads, I recall Dupre and Seng. Griffin shows a member E having a head over which the locking member R is moved. It was for the purpose of showing these pieces of metal with enlargements or heads that I referred to those patents and for that reason only.

There was a group of four patents to Oliver, two to 612 Lavoie and one to Delaney. Those all show in one form or another, a lathe such as is used by a mechanic in turning pieces into cylindrical or like forms, with a lathe spindle and a pulley wheel for a belt, and then a chuck at the forward end of the spindle for gripping the piece of metal or material which is to be cut and turned in the lathe. Those are all lathe chucks. This Lavoie patent 1,236,453 illustrates an artillery shell clamped within the lathe chuck to have some turning operation performed on it in the lathe. It has the appearance of an artillery shell. The same thing is true of the other Lavoie patent 1,295,994, it is shown chucking what appears to be a 613 cylindrical member. It is a long cylindrical member. It differs from the appearance of the other one, so far 330 as an artillery shell is concerned. As to whether I recognize that as an artillery shell or not, the chuck is of a kind which could be used in a big lathe for turning up artillery shells. In these lathe chucks the chuck jaws are operated by the application of pneumatic pressure under the control of the operator. They are operated in the forward direction by that means, and the return of the piston is accomplished by means of springs. That is true of Lavoie 1,236,453, the spring member being Number 18. It is true of Lavoie 1,295,994, the spring member being, I believe Number 36. It is true of Delaney Number 895,438, the spring member being Number 20. It is true of Oliver 926,761, the spring member being indicated by the letter I, Fig. 3.

Q. Now, there is no thought or intention in any of

these patents in making a connection through which
614 grease will flow, is there, from the chuck part or the lathe spindle through the artillery shell or the other piece of work held in the chuck?

A. They are all fluid operated chucks, the fluid actuating the clamping elements. There is no provision for flow of fluid through the chuck member. However, that could be provided if necessary, by placing a hole in the piston member. It would take more than that, depending upon what was being accomplished.

Q. Well, supposing you wanted to transmit grease under high pressure, running up into thousands of pounds per square inch: You would just have to go to work and remake the whole thing so it would no longer be a lathe chuck. It would be something entirely different, wouldn't it?

A. It would still be a chuck; probably not a lathe chuck.

615 331 Q. It could not be used for the purposes for which these patentees intended their things should be used for turning artillery shells or other pieces of metal, could it?

A. Well, it would be in the chucking art, speaking of chucks generally. The patents we have just looked at are for lathe chucks. If you made the changes and additions which you say might be made to transmit fluid, the Oliver patent 926,761, as I recall, provides for the travel of fluid pressure through the spindle to blow chips out of the chuck, and if that fluid—that fluid pressure could be arranged to be conveyed into the member that it chucked by means of the addition of a sealing member. You would have to add the sealing member, and add it in such a way that it would be actuated by the grease pressure so
616 as to force it up against the end of the fitting or nipple. You would have to do the same thing with all these other lathe chuck constructions; you would have to make some change in the drawing shown on the patent.

Q. Now, have you got the Wurster patent, Mr. Fox? Now, you referred to a Newton patent. Have you ever seen one of the devices made under that patent by Newton or his assignee, the New York Air Brake Company?

A. Not that I was aware of. I have passed a model in the other room. I was not aware of its origin or how it was made. I didn't pay much attention to it.

Q. That Newton patent shows a device for testing lengths of hose and hose couplings such as are used in air brake systems to connect the air brake line of one car with the next, does it not?

617 332 A. I think so.

Q. Well, we see here, do we not, the nipples in which such length of air brake hose terminate at 4 in the drawings of the patent?

A. Well, I was just looking at member 4. There is no hose shown in the drawings. It shows a nipple member Number 4. The title says, "Hose and coupling testing appliance."

As to whether the drawing shows at 4 in Figures 1 and 2 nipples of the kind which terminate the length of air brake hose used for continuing the air brake line from one car to another: I don't feel privileged to answer that inasmuch as I don't know how air brake hose is coupled nor the fittings that are applied to it. I have seen them at a distance. I have seen the hose hanging 618 between cars, with these coupling member that clap together and then drop and make a connection. I have seen them make the connection.

Q. Now, in this Newton patent it is said that the provision for engaging and making a fluid-tight or sealed connection with the nipple or coupling member 4 of the hose to be tested comprises a packing tube consisting of a piece of tubular fluid-tight material such as a length of hose pipe 5 of the proper size. Now, a hose pipe you said might be made of rubber or canvas. Do you recall that?

A. Yes.

Q. I don't know whether you meant there that the hose might be made wholly of rubber in one instance and in another wholly of canvas, or whether you meant that the hose would be made as a garden hose is, of canvas with rubber impregnated and vulcanized into the canvas.

333 A. With rubber impregnating the canvas to make 619 it tight against fluid pressure. The canvas gives strength and the rubber a degree of flexibility and fluid tightness through the canvas. This looks substantially like a length of the air brake hose of the kind I have seen. The two coupler parts go together in this manner

(indicating). What the Newton patent shows in Figure 4 is this metal nipple. I see the conformity in the shape.

(This length of air brake hose is marked for identification as Plantiff's Exhibit 59, and the air brake nipple as Plaintiff's Exhibit 60.)

As to whether the length of hose pipe that is referred to in the specification of the Newton patent is the length of hose pipe which slips over the end of this nipple when the testing of the hose is to be accomplished, as in Plain-
620 tiff Exhibit 60, that is not clearly shown in the patent.

The typewritten matter here is my own personal notes with reference to this particular patent. It is something that I wrote myself.

Q. Do you mind if I see that?

A. No. It is merely the way in which I have read Butler Claim No. 2, for instance, against the Newton patent.

Q. Now, you say that the Newton patent is not clear
621 in its showing and description that this exposed nipple end of the air brake hose coupler is to be engaged by a piece of tubular material such as a short length of hose pipe, do you?

A. My only point is that the drawing does not show a coupler member entirely such as you have in your
334 hands. The thing that makes contact with the piece of the nipple that is shown there is described by Newton as being such as a short length of hose pipe, part Number 5.

Q. And a piece of hose pipe of the kind made of canvas and impregnated with rubber would serve Newton's purpose of slipping over that metallic nipple and sealing the joint sufficiently for the passage of compressed air into the hose at a pressure of one hundred or one hundred and ten pounds per square inch, would it not?

A. I don't read where Newton specifically refers to
622 rubber or canvas. It would be suitable for his purpose.

Q. In making your physical presentation of Newton you made the device easily movable from place to place, whereas Newton shows a bolt for bolting it rigidly and more or less permanently to the wall, is that correct.

A. The Newton drawing shows a threaded stud. I don't read in the patent where any mention is made of the coupler being bolted to the wall.

As to whether that is the only purpose for that bolt that is shown there, I am not in a position to say. As to any other utility for it, if they had a handle or carrying device, I imagine it could be screwed on there.

Q. There is nothing said about any handle or carrying device, is there, in the patent?

A. No more than it says it is bolted to the wall.

If it were bolted to the wall you could pick up the
623 length of hose to be tested and connect it in the manner Newton describes, if the testing device were bolted permanently to the wall by that stud bolt.

Q. In making your presentation of Newton in this
335 A-68, you provided the piston rod with a large integral end in lieu of the separate plate 8 of the Newton patent, did you not.

624 A. I don't understand what you are referring to as a large integral end of this device. I will say there is a large end on that tube.

Q. As you have made it this integral end is much thicker than Newton's plate 8, is it not, relatively much thicker?

A. That is difficult to answer without having the two to compare. (The witness is handed the device.)

625 Q. That is for the reason, is it not, that you have departed from the description in the Newton patent by fastening this fiber sealing member back to the base plate 8?

A. It goes back to the base plate 8 in the same manner that part 5 of Newton goes back to the base plate 8.

Q. You have got a piece of hard fiber in there in your device which by the head of a screw is fastened back here to this plate 8 and the hollow piston rod associated with it, have you not?

626 A. The specimen you have in your hand will speak for itself. I made it or had it made for the purpose of bringing the hose pipe member 5 up against the plate 8 to form a seal. Page 1, line 52 of the Newton patent reads "a short length of hose pipe 5 of proper size to receive the end of the coupling member 4 within one end thereof, the other end being tightly clamped between an external expander or short tube 6, and a clamping ring 7,
336 mounted upon a carrying plate 8 with which the packing tube 5 is thus caused to make an air-tight connection."

627 Instead of making ours in that manner we have made a piece of hard fiber, provided a base or bottom for it through which we have put this hollow screw, which in turn is screwed into a hole in this back plate and piston member.

Q. Why did you substitute this construction that I have just described now for that of the Newton patent?

A. There is no substitution, in the sense that the same members are there, the hose pipe and the base member 8 and the inner ring number 6. There are no additional parts and no fewer parts.

Q. There is not any hollow screw in Newton, is there?

A. There is a member 6 that is hollow.

Q. That is not a hollow screw, and it is described as being an expander, isn't it? Top of page 1.

A. "A short tube 6," the line reads. It is line 54 on page 1. "member 4 within on end thereof, the other end being tightly clamped between an external expander or short tube 6, and a clamping ring 7." The expander or
628 short tube are two names for the same thing. It won't come out because it is in here to tightly to move it, but I will look here into this spring finger part.

Q. You can see, can you not, a shoulder closing your piece of fiber at the rear end entirely, except for the hole through which this screw projects?

A. That screw is a short tube that is referred to in the patent. This piece of hard fiber has an in-turned flange or shoulder at its rear end through which the screw projects.

337 Q. That arrangement prevents, does it not, the access of grease into the joint between the piece of fiber and the rear end of the spring finger part in which you have mounted it?

629 A. In Newton the part 5 is described as a tube such as a piece of hose pipe. In Newton that is of uniform diameter from end to end, except that up at the end against plate Number 8 it is deformed different than it is for the rest of the length.

Q. It is simply squeezed in there, is it not?

A. It is different in shape there than it is for the balance of the length.

Q. That is because it is made of rubber and canvas and squeezed between the expander and the base of the spring part, isn't it?

630 A. The patent does not say anything about its being made of rubber or canvas.

Q. It says it is made of hose pipe.

A. Yes. That does not necessarily mean canvas impregnated with rubber. It may mean fiber. Fiber is hose pipe. We have used this hard fiber. Hard fiber was in 1914, or since that time, used as hose pipe. It is flexible to the extent that it is not brittle. As to whether it is more brittle than a piece of wood, that depends upon the
631 wood. It is not as flexible as garden hose or air brake hose, nor fire hose.

As to its being used in the way in which any hose ever was used, I knew that it was available in tubular hose form.

Q. It was available in tubular form the same as a piece of an iron pipe was available in tubular form.

A. Pipe is pipe.

338 Q. Do you say that pipe is also hose? Is an iron pipe a hose?

A. An iron pipe is a conduit the same as a hose is for conveying fluids.

Q. It is for some such reason as that that you say you had a right to choose fiber for this hose pipe, isn't it?

A. Because it says "hose pipe," and iron pipe is pipe.

Q. Iron pipe would not have served the purpose in this demonstration model, would it?

A. No. That is the reason I used fiber pipe.

Q. Canvas hose would not have served your purpose in this model, would it?

632 A. I did not attempt canvas. I don't think it would work as well as the fiber. I don't think rubber hose would have worked as well as the fiber. I did not try it, ever. In making this model I did not try rubber. I never tried rubber. I went right to the fiber. That is true both for myself and all the men that worked with me in making this thing. We never tried hose at all. We went right to
633 the fiber pipe. I knew that rubber would not work in the presence of oil or grease. It would have sealed the joint, and held it sealed, if it was not deteriorated by the oil or grease; and it would hang on if it was not deteriorated. I know from my experience with rubber in oil what takes place.

Q. In your presentation of Newton here, the hollow retaining screw is threaded to the enlarged end of the

piston rod instead of being free, as is the case with Newton's tube 6, that is true, is it not?

A. As I understand Newton, the tube 6 is expanded into place.

634 339 Q. Is that your understanding of Newton?

A. An internal expander or short tube 6, line 56, page 2.

Q. Does that mean to you that a tube of metal is put in there and then after it is in place that it is enlarged by expansion?

A. I am unable to know, other than what the patent says about it. It is expanded in an internal expander or short tube 6. I can see the left hand end of the piece of hose pipe 5 with its internal bore somewhat enlarged. At the left hand end, it is deformed.

Q. Don't you think it is a more reasonable understanding of Newton that the piece 6 was a piece of metal which was tapered and which was forced into the interior of the piece of rubber hose pipe there in such a way as to expand it into contact with the base of the spring finger part?

A. As to one part of your question, Newton says nothing about rubber hose pipe. He says "Such as a length,

635 or such as a piece of hose pipe."

As a practical thing, the part 6 of Newton is a piece of metal which is given a tapered formation and then squeezed into the interior of the hose pipe 5 in such a way as to expand that hose pipe into contact with the base of the spring finger part.

Q. In your presentation of Newton is this not true, that the spring fingers contribute nothing toward holding the packing tube 6 in place, and that your piece of fiber is held in place entirely by the hollow retaining screw which goes back into the part 8 and the hollow piston rod?

340 A. If I follow that question, the fiber is held in the model A-68 by the spring fingers as well as the equivalent of part 6 in the Newton structure.

636 Q. In the device as shown in the Newton patent this piece of hose pipe 5 is held in place longitudinally by the spring fingers only, is it not?

A. The spring fingers and the expanding member of short tube 6.

Q. That end is in turn clamped to the base of the spring finger part, is it not?

A. The end opposite the nipple 4, yes.

Q. You have made this fiber part in your exemplification of three different diameters, have you not, one that is internally, one where the screw goes through to hold it longitudinally up to the plate 8, and then two other diameters, the final diameter at the outer end being that which goes about the collar of the little nipple with which you use this thing?

A. Yes, and there are three different diameters to the hose pipe 5 as shown in the Newton patent. They don't correspond at all. The diameter at the base is the smallest diameter of all.

Q. In Newton's it is the largest of all, is it not?

637 A. Well, it is hard to say that it is the largest from the drawing.

Q. And whatever differences there are in the internal diameter of this piece of hose pipe as shown in Newton are due to the fact that it is of very yieldable material, isn't that so?

A. There is nothing in the patent from which you could learn how yieldable it is.

341 Q. If it were hose pipe of the kind that you have described as being made of canvas and rubber, then its contact with these various things would cause the walls to yield to take these differing diameters as shown, isn't that so?

A. Comparatively, yes, more so that what fiber, for instance, would yield. I have given my fiber an internal bore there of three diameters, three differing diameters which the piece holds when it is removed entirely from its environment.

Q. That is not true of this hose pipe 5 of Newton, is it?

A. I don't know just from what that inference could be had.

638 Q. If it were hose pipe made of canvas and rubber, then if you removed it from its association there why you would expect the internal bore of it to be uniform from end to end, would you not?

A. Not necessarily. It would depend on how long it had been clamped in place. It may not come back again.

Q. Yours didn't get the way it did from being clamped long in place? You made it that way.

A. The fiber was turned in this way, yes.

Q. The three diameters you gave your piece of fiber then are not the same thing as the three diameters that are shown in Newton when the nipple is in place and clamped there, isn't that so?

A. I don't know that the clamping action beings about the shape of the part 5.

342 Q. It is reasonable to believe that it does, isn't it, if it were rubber hose, if it were hose pipe made of canvas and rubber and were installed in the way that Newton shows it to be and then put in use, why the yieldability of the material would cause these conformations to be pressed into it, isn't that so?

A. Not necessarily, because if it stood for quite a time in service before it was removed there is a very good likelihood that there would be no life left in the part and
639 it wouldn't come back to its original shape or maybe it was molded to shape before it was put in.

If it got as dead as that it wouldn't serve Newton's purpose, but it may be molded to shape too. As to whether there is anything about the patent that indicates that Newton had any such idea, the patent with reference to the hose pipe reads, "A short length of hose pipe 5." Fiber is a material which a hose pipe could be made of.
640 Fiber is not entirely rigid. There is some flexibility. Within ordnary commercial reference fiber is not rigid, to the extent that iron pipe is, for instance. As to whether hose was made of leather in 1914: I don't know of an application of leather in the form of a hose. I don't know of just a specific case where leather was used as a hose. I know it could be formed into such if need be, similar to the way they make these hat leathers, flange leathers.

641 Referring to the Wurster patent, that shows a tank of oil with a little pump for pumping oil from the tank into the end of the axle of a buggy. The attachment of the little pump to the end of the axle was made by hand simply by screwing a connecting nipple into a screw threaded hole, and up against what I recall as a valve box G. To make the detachment by hand you unscrew that screw threaded part. Generally speaking, of all these prior
343 art patents to which I have referred, the only ones which refer in any way to the art of lubrication are those to Richardson and Dupre and Seng and Wurster.
642 All the patents to Richardson, Dupre, Wurster, and Seng,

show headed fittings. The Wurster patent 356,519 shows a compressor having a coupling member. I can't make up my mind which is the nearest or closest.

Q. Can you name any one patent or other publication
643 or any patent application filed prior to the filing of the application for the Butler patent in suit on February 19, 1923, which in and of itself discloses lubricant equipment comprising in any form whatsoever nipples permanently attached to the bearings and a compressor having a coupler adapted for attachment to any of the nipples, in which the coupler has any kind of means whatsoever for compressively clutching or mechanically gripping the coupler to the nipple and any kind of means whatsoever for sealing the joint between the coupler and the end of the nipple against leaking, both of which means are automatically operated by the pressure of the lubricant in such a way that the intensity of the mechanical grip and the tightness of the end seal are increased as the pressure of the lubricant is increased?

A. I will look through my patent references here. I would say the first one I come on to here, which is F. D. Winkley re-issue 14,667 is for a lubricating system in which there is a compressor, a coupling member, and a
644 headed nipple. I find this Winkley patent shows what is accomplished by the Butler patent.

Q. Can you name any one patent or other publication, or any patent application filed prior to the filing of the application for the Butler patent in suit on February 19, 1923, which discloses any kind of pumping system for any kind of fluid whatsoever, either liquid or gas, in which
344 there is a compressor connected to a nipple by a coupler, which includes a cylinder and piston cooperating so as to tighten any kind of gripping elements inwardly around the nipple upon actuation of the compressor, and which also includes a fluid pressed seal engaging the end of the nipple to effect a fluid tight joint. I have cut that out of my notes so that you can read that question as well as having heard it.

646 A. This does not actually or truthfully state what the Butler patent does. I would say that the Winkley patent meets the requirements of both of the last two questions to the extent that the Butler does to what you refer.

647 As to which disclosed any kind of pumping system for any kind of fluid whatsoever, either liquid or gas, in which

there is a compressor connected to a nipple by a coupler, which includes a cylinder and piston cooperating so as to
648 tighten any kind of gripping elements inwardly around the nipple upon actuation of the compressor, and which also includes a fluid-pressed seal engaging the end of the nipple to effect a fluid tight joint. The question reads "A coupler which includes a cylinder and a piston cooperating so as to tighten any kind of gripping elements inwardly around the nipple". I do not agree that the Butler structure tightens the gripping elements around the nipple, but instead that the Butler structure positions the gripping elements under the head of a nipple.

Q. Now, let's stop right there. Don't you remember that several days ago we went all through that and you agreed that no matter how flimsy you might make the Butler spring fingers, regardless of how stiff they
345 might be, still to the extent of their stiffness, much or little, they would transmit some force, the effect of which would be to give the jaws a radially inward movement so as to compressively to clutch them about the nipple.

A. No, I did not say anything such as that. My testi-
649 mony, as I intended to give it, was to the effect that such movement as the Butler spring fingers imparted to the segment was of a positioning nature and not a gripping nature.

Q. Now, the language of the Butler patent in this, "for compressively clutching the elements upon the nipple",—that's the language of claim 2. Now, do you say that that function and result are not present in a structure built in accordance with Butler?

A. No. There is no piston cooperating to tighten the gripping elements inwardly around the nipple.

Claim 2 of Butler speaks of the actuation as being that "to forcibly compress said elements"—that's the locking elements. That does not necessarily mean that they are tightened around the nipple. They may be compressed for the purpose of positioning. In my opinion, they are not compressed in such a way as to be tightened around
650 the sides of the throat as shown, under the Butler structure.

When the patent speaks of means carried by the cylinder for compressively engaging about the nipple for locking said parts together, Butler has that, shows that.

Q. Now, is there anything else in this second more or less formal question which you say is not disclosed by Butler? You have said that he does not disclose a cylinder and piston cooperating in such a way as to
346 tighten some kind of gripping elements inwardly
651 around the nipple. Now, what else in my formal question No. 2, if anything is not present in the thing disclosed by Butler?

A. That is about the extent of the difference I find.

On the 4th of June, 1935 I was called as a witness for defendants and testified under oath in the suits of Stewart-Warner versus G. S. Rogers and Stewart-Warner versus Universal Lubricating Systems, Incorporated, suits pending in the United States District Court for the Western District of Pennsylvania, Nos. 2983 and 3041. That was before Floyd A. Buchanan, a notary public within and for the City of St. Louis and State of Missouri. Mr. Kalish of Philadelphia examined me as his
652 witness on direct examination, and Mr. Williams cross examined me at that time. In testifying in that suit I identified samples of the Lincoln Company's Kleenseal fittings just like those here involved, and I was asked, at the bottom of page 18 of the record:

"Q. Referring now to the fittings, of Defendants' Exhibit No. 5"—

Those were the Lincoln Kleenseal fittings. Looking back a page or two—

—"can you state briefly how the dimensions of those fittings were arrived at?"

And then I said:

"The fitting was designed primarily for the lubrication of automobiles, and we consulted with and secured the cooperation of the engineers of one of the dominant motor car builders in arriving at the approximate proportions. The actual dimensions were, of course, worked out and applied by ourselves."

That referred to the engineers of the General Motors Company.

347 Five lines from the bottom of page 19 I took up the matter of the diameter of that fitting and said there:

653 "The actual diameter of approximately one-quarter inch arrived at was occasioned by the fact that commercial drills, reamers, are available in local stocks of a size lightly over even fractions. To make the point clear, if

we were to have made this diameter in decimals, for instance, .260 instead of .250, we would have had to have had special drills and reamers made for our production, in order to machine the holes in the nozzles through which the fittings is designed to enter."

The nozzles to which I referred were the nozzles which I have described here as the N-6 nozzles and the friction collar type.

One of the reasons, given in that testimony, that we gave to our fittings a diameter of a quarter inch was because we could get stock drills which would drill the holes of these cooperating parts, that is, the shell of the N-6 nozzle and the hole through that friction cap, of a
654 size such that they would cooperate with a fitting having a diameter of a quarter of an inch. That fairly states the purpose of what I here said, as just read. That's the only reason I gave throughout that whole deposition for giving the Kleenseal fittings the diameter which they have. What I gave is here in the deposition.

Q. Now, when you were endeavoring upon your direct examination in this case to state the reasons for having given your Kleenseal fittings the dimensions which they do have, you did not give this reason at all, did you?

655 A. As I recall the direct testimony there was a reference made to the drill tool sizes.

348 *Redirect Examination by Mr. Haynes.*

656 Referring to the Barks patent 1,966,278, Plaintiff's Exhibit 54, Fig. 5, part 57, illustrates a hydraulic fitting that was being used some time prior or about the time that this patent application was filed in May, 1933. That is what has been called in this suit the Alemite hydraulic with the triangular aperture. The part 59 represents the head of the hydraulic fitting showing serrations on the outside.

Referring to Defendants' Exhibit A-43; the slotted cup of this exhibit does not expand radially enough to pass over and lock behind the head of a headed fitting.

Q. What is the magnitude of the radial expansion of
657 those slotted cup elements in that Exhibit A-43? I ask you to refer, if you care to do so, to a drawing which I hand you marked Lincoln Engineering Company part No. 10-437, dated September 4, 1934, and to a drawing

of Lincoln Engineering Company marked part No. 10-438, dated September 4, 1934.

A. From the drawings I can see that the friction collar member would not expand more than one-thousandth of an inch radially.

(Defendants offer said drawing of part No. 10-438 in evidence as DEFENDANTS' EXHIBIT A-74.)

(Defendants offer the drawing of part No. 10-437 in evidence as DEFENDANTS' EXHIBIT A-75.)

658 Referring to a four-page bulletin marked in the lower corner of the first page "Copyright 1934 Lincoln Engineering Co.", this is one of our company's publications: It illustrates and describes several ways of using our company's N-D-1 nozzle and N-D-5 nozzles. This publication shows the manner in which the N-1 nozzle is used in connection with Zerk and hydraulic fittings. In the 349 second photograph down it shows the manner in which pin-type fittings are contacted to hold pressure 659 by the N-D-5 nozzle. It likewise shows the manner of changing the N-D-5 from a pin-type coupler by removing the cap, including the jaws, and inserting in its place an extension nozzle, that is, one having an N-1 nozzle on the end of it. Another photograph shows use of the base part of the nozzle for the purpose of cleaning the needle in the N-1 nozzle. In other words, the nozzle tip assembly of the N-1 is removed by the fingers from the base of the nozzle N-1, leaving exposed a conical tapered nozzle. The tip of the N-1 nozzle is reversed so that the high pressure needle goes against this conical taper of the base of the nozzle so that pressure may be forced through the base of the nozzle forcing the obstruction or foreign matter out of the high pressure needle and thereby cleaning it. What I have been saying is on the four-page bulletin now in my hands and copyrighted in 1934, and in addition to that it shows the base nozzle entered into the equipment a tapped hole where the application of lubricant is required without creating pressure. That tapped hole is that I referred to in my earlier examination sev- 660 eral times as a hole without a fitting.

(Defendants offer said bulletin in evidence as DEFENDANTS' EXHIBIT A-76.)

At the time my company was marketing the N-1 nozzle it had a nozzle for the purpose of going onto the pin-type fitting. That was known as the model N-D-5, referred

to on the four-page bulletin I have mentioned. That
350 is the N-D-5 nozzle which was formerly complained of in this suit. When my company designed the Lincoln Kleenseal fitting it had handled large quantities of the Zerk nozzles. The occasion for that was that we received those nozzles in large quantities from the Alemite
661 Corporation, in fact stocked large quantities of them for Alemite at our St. Louis plant for packing with Lubriguns which we built and which Alemite sold. At that time then my company was thoroughly familiar with the construction of the Zerk nozzles. When my company was designing its Lincoln Kleenseal fittings we were interested primarily in a pushtype coupler or nozzle.

In my cross-examination I referred to a Winkley patent. That was Winkley re-issue patent 14,667. That patent shows a compressor having a flexible hose and a coupling nozzle coupled onto the head of a fitting, all in
662 Fig. 1. The coupling member composing part 9, Fig. 3, is composed of a yielding piston.

(Defendants offer said Winkley patent in evidence as DEFENDANTS' EXHIBIT A-77.)

Mr. Haynes: The record has quite a number of references to charts by number, and in order that the record may be complete, may I merely state on the record that chart 1 is a photostat copy of sheet 1 of the drawings of Butler patent 1,593,791.

663 The Witness: Referring to this chart 3. That shows six illustrations. The upper left illustration is a photographic enlargement of Defendants' Exhibit A-9. The upper right illustration is a photographic enlargement of Defendants' Exhibit A-8. The left middle illustration is a photographic copy of Defendants' Exhibit A-28.
664 351 The right middle illustration is a photographic copy of Defendants' Exhibit A-30. The lower left illustration is a photographic copy of Defendants' Exhibit A-37. The lower right illustration is a true drawing of the Lincoln Kleenseal fitting shown in Plaintiff's Exhibit 27-A.

Mr. Haynes: The chart 4 is a photostat of the Linders patent 1,947,208.

Mr. Williams: Wait just a minute. I am not concerned, if it is necessary to take the time here to identify those, but I do not see why either of us should not be entirely free, if we want to make photostatic enlargements of

things that are in evidence, to do so without using up several pages of the record.

The Court: You may have that right. You may have the right to do that and to label them and let them speak for themselves subject, of course, always to checking up by opposing counsel for errors.

Mr. Haynes: Chart 5 is a photostat of the drawing of Barks patent 2,010,174. The patent is exhibit A-42.

665 Chart 6 is a photostat of a drawing of Barks patent 1,966,278. The patent is Plaintiff's Exhibit 54.

Chart 7 is a photostat of a drawing of Newton patent 1,118,876. The patent is Defendants' Exhibit A-67.

Chart 8 is a photostat of the Lavoie patent drawing 1,236,453. The patent is Defendants' Exhibit A-63.

Chart 9 is a photostat of the Lavoie patent drawing 1,295,994. The patent is Defendants' Exhibit A-64.

Chart 11 is a drawing of the Pinel French patent 327,557. The patent itself is Exhibit A-69 and a translation thereof is A-70.

Charts 17, 18 and 19 have been offered in evidence, and so has 21.

352 Chart 23 is a photostat of the drawings of Fox pat-
666 ent 1,959,529, excepting that one or more of the figures have been relocated.

Chart 24 has been offered in evidence.

(Defendants offer in evidence as DEFENDANTS' EXHIBIT C-3 the chart 3 which the witness identified a few moments ago.)

The Witness: My company was interested in a push-type coupler rather than a lock-on type, because it was so much easier to get a push-type coupler off of a fitting. As between the Zerk push-type nozzle and the Lincoln
667 Kleenseal N-6 nozzle, my company preferred the N-6, because of the fact that considerable more pressure could be held with the same effort in holding the nozzle against the fitting in the case of the Kleenseal as compared to Zerk.

I take the test block, Exhibit A-62. On the side of this block where the 10,000 pound gauge is, I have a fitting in place and a sleeve around it. That is a Lincoln Kleenseal fitting like Plaintiff's Exhibit 27-A. The reason for the sleeve around the fitting is to indicate the difficulty that is encountered in getting a locking jaw type of coupler off the head of the fitting. I now remove

the sleeve and operate this fitting in connection with a Lincoln Kleenseal hand gun having an N-6 nozzle such as Plaintiff's Exhibit 41 which I now have. It will be nec-
668 essary that I have a fitting to close in one of the holes in this demonstrating block since apparently the model of the Newton fitting has been removed. I place the fitting on the block. I now take Exhibit 41 and enter the N-6 nozzle over the end of the Kleenseal fitting, the needle centering quickly in the hole of the fitting. I now operate the Exhibit 41 to show a pressure of 5,000 pounds on the pressure gauge and remove the N-6 from the fitting.
353 There was no resistance whatever to that removal of the nozzle. The fitting is cleaner than is ordinary.
669 it is clean. I did not have to put that coupler at an angle to the axis of the fitting in order to get it off.

I now build up the pressure again just for a moment, and having the coupler at a moderate angle to the axis of the fitting. To show whether any leak occurs, I now attach the N-6 nozzle, centering the needle in the hole of the fitting. I failed to center the needle. I have the pressure open now. I will now center the N-6 in the hole of the fitting. I have it at a moderate angle. And now I will develop pressure, and then tilt at a slight angle and hold the pressure. I angled a little too much and lost some lubricant. Nevertheless at the angle I am holding it now, I have got 5,000 pounds on the gauge and I am still pumping without a loss of lubricant.

670 I now put the N-6 on the fitting in the usual way, and have a moderate angle during the pumping. I now have the N-6 nozzle centered on the fitting. I have been tilting this way so that the Court may see the angle. I now center the needle in the hole of the fitting and develop pressure. I have got 2,000 pounds pressure. Now, I
671 have got 3,000. I cannot read at what angle. It is difficult from my position here to read the degree of the angle. Now, I am still holding—I have got 4,000 pounds pressure. Now, I have got 4,500 pounds. I will angle it just a little more, and get a leakage there and it will come back
354 a slight bit. Now, the grease—the gun is apparently out of grease and the gauge is at 4,500 and I am at an angle—

I now have an Alemite hand gun on which is an Alemite hydraulic coupler. The exhibit number is 51. I now apply the nozzle of the Exhibit 51 over the Kleenseal

fitting and force the pressure gauge to read 5,200 pounds. 5,700 pounds. Now, in removing the gun if I attempt to remove it on a straight line with the fitting I have difficulty. By jerking it does come off. In lubricating an automobile an operator is sometimes in a position where he needs to pull the coupler off in a practically straight
672 line with respect to the axis of the fitting.

I now place that sleeve around this Lincoln Kleenseal fitting. I refer to the sleeve which prevents me from having much of an angle of the coupler when the coupler is on the fitting. I am now screwing the sleeves over the threaded base into which the Kleenseal fitting is screwed. I now apply the Alemite Exhibit 51 to that Lincoln Kleenseal fitting in this sleeve and operate the handle to develop 7,200 pounds. When I endeavor to remove the gun I pull the block, gauge block, wooden base and everything entirely with the gun. I cannot raise the gun off of the fitting by a pull steadily in the direction of the center line of the fitting.

673 I now relieve the pressure. I am now trying to get it out, but I am having some difficulty. There it is. After shaking it it breaks the connection between the fitting and the coupler, and coupler is withdrawn.

355 Instead of using the Lincoln Kleenseal gun exhibit which I used a few moments ago, I shall use a duplicate thereof, which is full of grease. I now demonstrate the action of the Lincoln Kleenseal nozzle on that Lincoln Kleenseal fitting with the sleeve around it to prevent angling. I place the N-6 nozzle over the fitting engaging the needle in the hole of the fitting and then dropping the pressure on the gauge to zero.

I will now operate the gun to build up a pressure of 9,500 pounds, and I withdraw the gun from the fitting with no effort whatever, no more trouble in taking it off than putting it on. The fitting still has the sleeve
674 around it. If this demonstration had been made with a power gun instead of a hand operated gun, the comparative results would have been exactly the same. That is, the use of a power gun instead of a hand gun would make no difference.

As to my understanding of the difference in principle between the Bulter patent disclosure as exemplified in Butler claim 2 and the Alemite hydraulic coupler: In the first place in attempting to read the claims of the Butler

patent on the Alemite hydraulic coupler it is inconceivable how the rearwardly movement of the cylinder of the hydraulic coupler could be substituted in the Butler structure and still maintain the scope of the Butler patent. In the second place, there is a difference in principle involved in the movement of the cylinder rearwardly, as in the case of the Alemite hydraulic, in order to compress or move the clamping elements toward the center of the fitting as against the principle of advancing the piston element forward, as in the case of Butler. The prin-
675 356 ciple of moving the cylindrical sleeve backward is resorted to in structures where it is desirable to wedge the clamping member around the fitting in a manner whereby the wedging action is increased as the pressure within the coupler is intensified. That is shown, for example, in the Newton structure. There is no requirement in the Butler structure for wedging the locking members continually or progressively as the pressure within the cylinder is increased, consequently Butler does not use a rearwardly returning cylinder in order to lock his segment elements.

The principle of the rearwardly returning cylinder provides a manner of backing up or supporting the wedging clamping elements, as exemplified in Newton. There is no backing up, no member to back up the positioning spring fingers of Butler because backing up is not required, and as a matter of fact instead Butler shows clearance within his collar 32, as I recall, whereby the spring finger is free to move and open to permit of radial movement of the segments to clear the head of the fitting.

There is still another difference in the principle of a rearwardly moving cylinder element for clamping as against the Butler principle of the forward moving pis-
676 ton, and that is in chuck practice. In a chuck design it is the practice to provide a means or a manner of returning the piston element—I am speaking of fluid actuated chucks—so as to relieve the gripping elements. In the case of lathe chucks in evidence, Lavoie, Delaney and I think Oliver there are spring means provided for returning the piston member so that the work within the chuck jaws, or the piece within the chuck jaws, can be removed. In the case of Newton the return of the piston is accom-

plished by fluid pressure so as to open the spring
357 fingers and withdraw the nipple. In the case of Butler there is no provision in the patent for returning the piston, consequently the only way that the headed fitting can be removed from between the jaws, or the jaws move out to clear the head of the fitting is by reason of the springiness of the spring fingers opening within the clearance provided within the coupler in order for the fitting to be withdrawn from the coupling member.

677 A chart entitled "Comparison of Richardson Patent 8251 of 1851 (Defendants' Exhibit A-45) and Richardson Fitting model (Defendants' Exhibit A-46) is marked for identification as Defendants' Exhibit A-78.

That drawing was prepared under my direction. The legends on the drawing are true. The drawing accurately depicts what it purports to depict.

678 (Defendants offer said drawing in evidence as DEFENDANTS' EXHIBIT A-78.)

I have a drawing entitled "Comparison of Richardson Fitting Model (Defendants' Exhibit A-46) and Kleenseal Fitting (Plaintiff's Exhibit 27-A)". This drawing was prepared under my direction. The legends on the drawing are true. The drawing truly depicts what it purports to depict.

(Defendants offer the drawing in evidence as DEFENDANTS' EXHIBIT A-79.)

679 358 *Recross Examination by Mr. Williams.*

Defendants' Exhibit A-76 shows what is known as the Zerk fitting.

The Court: The Zerk fitting is always an Alemite fitting according to the record?

A. Yes. The other one shown is the Alemite Company hydraulic fitting. And the third one shown there is the Alemite Company's Gullborg pin fitting. The circular,
680 Defendants' Exhibit A-76 was published in 1934. That appears from the copyright notice. As to when it was within that year that it was published, I would not undertake to say definitely.

681 Proceedings of Wednesday, April 22, 1936,

682 *Redirect Examination by Mr. Haynes.*

The approximate date of publication of my company's bulletin, Defendants' Exhibit A-76, was between July the 1st and July the 15th, 1934.

I did not find any specific reference in my direct testimony to drill sizes as affecting the diameter of your Kleenseal fitting. In my direct testimony I was not asked why I selected .250 for the diameter of the fitting rather than a few thousandths larger or smaller. At page 653 of the typewritten transcript, line 4, I used the
683 phrase "even fractions". By that I meant fractions of a sixteenth of an inch, such as 3/16ths, 1/4 and 5/16ths. A fitting diameter of 3/16ths inch or less would not have been suitable in the Lincoln Kleenseal fitting, because it would not have had enough wall thickness. In the Lincoln Kleenseal fitting a diameter of 5/16ths inch or more would not have been suitable. On cross-examination
359 I was asked regarding the quantity of sales of Lincoln Kleenseal nozzles. I think I have those figures down to the present time. Up to the present date the combined total of N-1 and N-6 nozzles is in excess of 133,000. At the present time the quantity which we are
684 selling is in excess of a thousand a day.

Recross Examination by Mr. Williams.

Relative to this matter of drill sizes, this matter of even fractions came into the testimony which I gave in the Universal case, wherein I said:

"The actual diameter of approximately 1/4 inch arrived at was occasioned by the fact that commercial drills, reamers, are available in local stocks of a size slightly over even fractions."

That is the part that I was testifying about this morning.

Q. And you went on to say that if you had had a size different from a quarter of an inch:

"we would have had to have had special drills and reamers made for our production",

did you not?

Mr. Haynes: That is an inaccurate statement of what

he said, Mr. Williams, if you are purporting to quote
685 what he said.

Mr. Williams: I am endeavoring to. Where is the inaccuracy?

Mr. Haynes: What he said was:

"To make the point clear, if we were to have made this diameter in decimals, for instance, .260 instead of .250, we would have to have had special drills and reamers made for our production, in order to machine the holes in the nozzles through which the fitting is designed to enter."

360 Mr. Williams: Q. I gather from what you have said this morning that you wish to explain your testimony in the other case by saying that drills 1/16th of an inch in diameter, 2/16ths which would be 1/8th inch, and 3/16ths, 1/4, 5/16ths and 3/8ths are even drill sizes which can be bought from stock. Is that a more explicit statement of the point you are making now?

A. No. The drill size would be of a size slightly over the even fractions.

Q. If I go to a hardware store and ask for a 3/16ths inch drill what do I get, one that is 3/16ths of an inch in diameter or more than that?

A. You would get a 3/16ths inch diameter if that was what you asked for.

Q. I don't understand this matter of being a little over the nominal size. Do you mean a 3/16ths inch drill
686 drills a hole that is slightly larger than 3/16ths inches in diameter?

A. No. The hole which a 3/16ths inch diameter drill would enter would have to be slightly over 3/16ths inches in diameter.

Q. In order that it should slip over in the fashion desired?

A. Yes.

Q. Now, a quarter inch drill does drill a hole a little larger than a quarter inch diameter, does it not?

A. I think that's a rather technical matter.

Q. Well, it is a fact though, is it not?

A. Depending upon the way the drill is ground. From a machinist's point of view of it, I am not qualified to answer.

361 Q. You run your shop, you said you did, didn't you?

A. I have charge of production.

Q. Well, whether you know about that or not, do you mean to tell the Court now that from local stocks that can be bought any day that it is possible to get drills
687 which graduate in size only by even fractions of 1/16 of an inch?

A. No.

Q. Now, the fact is you can go and buy them out of stock any day and anywhere, graduated by a 64th of an inch above and below a quarter, can you not, 63, 64, 62, —that's 31/32nds, and 61/64ths? Similarly, you can get them 17— I am misstating, you can get them 17/64th or 18/64ths or 19/64ths or 15/64ths, 14/64ths, you can get all of those out of stock anywhere, can't you?

A. Yes. And in addition to that you can get numbered drills, numbered in accordance with the stub wire gauge, of sizes varying by a few thousandths above and below a quarter inch.

688 *Redirect Examination by Mr. Haynes.*

It is a fact that drills and reamers of even fractions, that is, 1/16th of an inch variation are more readily available as compared with these odd sizes.

Mr. Haynes: Defendants rest.

Recross Examination by Williams.

Q. I don't suppose you have secured any data or information as to the number of Lincoln Compressors with the Kleenseal nozzle either of the N-1 type or N-6 or
362 any other type which you have sold to the automobile manufacturers to whom you have sold your Kleenseal fittings, have you?

A. I do not have that information available.

689 Plaintiff's Rebuttal Evidence.

JOSEPH E. OTIS, JR., Witness for Plaintiff.

Direct Examination by Mr. Williams.

I have here some papers which have been marked for identification as Plaintiff's Exhibit 52, several sheets being lettered seriatim from A to O inclusive. Advertisements and reading notices such as appear in these papers were published in the several trade publications whose names appear upon the papers and at the dates which there appear. There was other advertising literature appearing in other trade papers of the same general
690 character, and of which these particular papers are typical, and throughout this period covered by the dates of these particular papers.

(Plaintiff offers these papers in evidence as PLAINTIFF'S EXHIBIT 52.)

(No cross-examination.)

690 363 LYNN A. WILLIAMS, JR. (Recalled), Witness for Plaintiff:

Direct Examination Continued by Mr. Williams.

691 Q. Now, I will ask you to take the Defendant's Exhibit A-61 which was presented by Mr. Fox as embodying his understanding of the invention of the Butler patent. Will you please state whether or not this exhibit fairly and accurately presents that invention, and gives the reasons for your answer?

A. The model A-61 device which Mr. Fox presented is made in such a way that some of its parts correspond with the dimensions shown in the Butler patent, and other dimensions and particularly one rather important dimension deviate very materially from the showing of the drawing in the patent. Now, I have measured the parts of this device and I find that the piston assembly which I have removed, that is, the part including the brass ring over the flimsy spring fingers, that part is, as I measure it 1-1/4 inches long. Now, in the patent the similar part

is almost precisely one inch long. Now, that might seem like a trivial deviation. The fact is, however, that this piston assembly is made so long that when it is screwed up into the outer shell by the end cap the whole assembly is clamped in there, perhaps not rigidly but nearly so, so
692 that it does not have any endwise movement backwardly into the shell, into the space 50, which is shown provided for it in Fig. 2 of the Butler patent.

Now, it is in this way, and in this way only, that it has been possible to demonstrate the effect that Mr. Fox showed in the wooden model where he inserted a stub of a pencil back of the piston preventing its backward movement. In this case no pencil, of course, can be in-
364 serted. However the cup leather 45 presses firmly against the back end of the cylinder so that the piston assembly cannot move backwardly to allow the radial outward movement of the jaws.

Now, if your Honor will just glance inside this cup your Honor will see a clean ring, which corresponds with the place that this washer has assumed on that back plate. Now, when we assemble those parts and screw them up we see that this cap screw screws easily until it gets almost closed, and there it begins to make contact with the jaws, and your Honor can feel that that gets tighter just before it gets there. And from there on the screwing up forces those jaws into the conically shaped projections left at the ends of the spring fingers.

693 Now, the result of that is that it holds those jaws in such a way that they cannot be retracted, the piston won't move back to allow them to retract. In other words, as the pressure is relieved the force is not relieved, and we get that pencil effect here because of the abutment of the washer 45 against the back plate.

Now, in the patent there is shown very clearly a space of about a quarter of an inch. I have measured the internal bore of the cylinder and I find that the length is about 1/16th of an inch longer than the length shown in the patent. In other words, the clamping up effect is about 3/16ths of an inch, and that corresponds with the 3/16ths of an inch which is shown in the patent as the clearance back of the piston.

365 Now, when that assembly is screwed up there is no possibility of movement, and as we see the fitting cannot be forced in there into the coupler. I am not

pushing as hard as I could, but by the deflection of my finger, or the mark on my thumb, you can see that I am pushing it with a good substantial force. Now, it is in that way, and because of that deviation, and only in that way that it is possible to demonstrate this supposed inoperability.

694 I can show that very clearly—I could show it clearly by shortening that piston assembly. I cannot do that here in court. But I can lengthen the bore in which it moves by unscrewing the forward cap about two turns and inserting a match in the space which is left, perhaps a little more than 1/16th of an inch, and then the fitting goes on quite easily and comes off easily, and this device is easily operable when it is made in this way which gives that space back of the piston which is necessary. I have now taken the fitting from the exhibit. It is a part of exhibit A-61. I screwed it into a testing block which I will clamp on to the table and then I place the coupler over the fitting, screw up the gun to move the parts forwardly in the cylinder.

Mr. Koenig: Let the record show that he screwed the gun while the coupler was on the fitting.

The Witness: The piston parts in the cylinder moved forward, but no pressure registered on the gauge.

366 Now, I put the parts onto the fitting and this time
695 screw up the compressor to develop pressure and I find the pressure coming up 1500, 1600, 1700 pounds. Then, I relieve the pressure and back off the compressor so as to relieve the pressure in the coupler, and then take it off quite easily with my fingers.

Now, in doing that to relieve that grip there, I could do either of two things, push downward, as Mr. Fox did to try to force this part back, that is, the piston parts so as to let the jaws move outwardly or by cocking it slightly I could pull it off.

Now, I have here a cap for this which has been made up so that it is 1/8th of an inch longer inside. I don't suppose, perhaps, that it is necessary to demonstrate that operation. Of course, it works just the same way as this works with a match inserted in it to provide that movement back of the piston. Now, if that piston had been made of a length properly proportioned to the inside bore of that shell it would work in just the way I have demonstrated it, and exactly in the way that Butler de-

scribes its operation, and that would be so regardless of the fact that this brass ring was in place around the spring fingers.

I now take a substitute cap and demonstrate that so
696 that, we can put it in evidence. I now have the end cap which is approximately 1/8th of an inch longer, and this end cap has been blued by heat so that it can be told easily or distinguished easily from the end cap which came with the device in the first instance. That differs from the defendant's cap in that the distance from the shoulder on the outside to the base or shoulder on the inside is 1/8th of an inch longer. And the effect of that is to lengthen the cylinder 1/8th of an inch. You
367 could do it by adding it at the back or you could do it by shortening the piston. You will observe that when I place that on the fitting it slipped on very easily, there was no forcing necessary.

Now, the grip has been effected as I screw up the compressor. In wobbling it there before any substantial pressure was developed I loosened that grip.

Now, I have pushed the coupler onto the fitting and as I screw it up the grip is effected and the end seal slides down and makes the seal and develops a pressure of fifteen or sixteen hundred pounds. Then, I relieve the pres-
697 sure, back off the compressor so that the grease back of this piston has a place to flow. I think Mr. Fox spoke of it as being an incompressible fluid, and of course that's so, but it flows up into the tube, or out into the bearing as the case may be. And then by pushing down I loosen the grip and pull the coupler off. When I pulled the coupler off, it lifted the gauge block attached, but I did that pulling with my thumb and fore-finger. I will now replace the cap, which is 1/8th of an inch longer.

(Plaintiff offers in evidence the substitute cap as PLAINTIFF'S EXHIBIT 61.)

I made these demonstrations with Mr. Fox' brass ring slipped over the spring fingers to make them completely stiff or rigid. The brass ring was in place, and I should say that the fingers were substantially rigid when that is so. The ring may yield, but very slightly.

Q. Could someone else put that together or do you want to do something more with it now?

698 A. Well, I think that here I can show very clearly

that this piston is now forward, just, after I have
368 used it with the longer cap. The piston is forward by about 1/8th of an inch, and I have got to force it back by screwing up this much shorter cap. As I do that the grease will be forced through the hole in the washer so that we can see it curling through.

Q. Now, Mr. Fox presented a drawing having the caption "Defendants' models prove Butler coupler is inoperable without spring fingers". This is marked chart C-21. He presented this as representing the construction embodied in his Butler model, Defendants' Exhibit A-61. Does the model correspond with the drawing?

A. No. The model is different from the drawing. The drawing shows a space back of this piston assembly. Now, if that space were there, there would not be this cleaning effect of that coupler against the back plate, there would be freedom of movement inwardly and outwardly, and that would be so whether the brass ring was in place as
699 shown in the lower figure just as well as in the upper figure. So that this drawing does not represent even the model of Defendants' Exhibit 61.

Q. Will you please explain wherein Mr. Fox' Butler model, constituting Defendants' Exhibit A-61, is not an accurate of fair representation of the invention of the Butler patent?

A. The adjustment is made in such a way that there is no possibility of clearance of the jaws over the head of the fitting, and in addition to that it has been necessary to add this inner cup, or cylinder, in order to hold that cup leather. Now, there is nothing like that shown in the patent. There is no need for anything like that
369 in the patent. In other words, that model does not correspond to the patent, first, because it does not work because of that clearance, and, second, because it has got this extra part which it was necessary to add after the first deviation from the patent had been made.

700 Q. Now, consider it without the added brass ring.

A. When we take the brass ring off, the fingers flare out slightly so that the jaws drop back farther into the cup or into the spring fingers, and in that way we get almost enough clearance to get the coupler over the fitting. Then, the spring fingers yield whatever additional amount is necessary, and it is not very much, to slip the

coupler over the fitting. Now, in that case, of course, the inner cup or inner cylinder or the leather is absolutely essential because if it were not there, obviously the grease would spill through the slits and we would not get any grease whatsoever except as we might get it all over the place around the fitting and not in it.

Q. Can you demonstrate there what, if any, latching there may be between the head of the fitting, as Mr. Fox presented it, and the jaws of the coupling with his brass outer ring removed?

A. (Witness starts to do as directed.)

Q. While you have that out, let's defer an answer to this last question and just state whether or not it is in accordance with the disclosure of the Butler patent, as you understand it, to cut or run the slits in the inner
701 cylinder 42 all the way from the forward end of the cylinder to the base, as in this Defendants' Exhibit 61 sample?

370 A. No. That's contrary to the teaching of the Butler patent, and we can see that by the fact that when it was done then it became necessary to add another element to overcome the difficulty. I can show that other element which is added to overcome that difficulty. If we unscrew the collet which we have on the inside of this cup, and that's where the cup leather moves in the Butler patent, it is shown as being directly in contact with some outside member, and I think that the reasonable thing is to carry the slits back to a point where they will not cause leakage of grease, back of the cup leather. Here where they are carried back all the way you would get leakage unless you had this inner cylinder.

It is not necessary to the operation or operability of the device of the Butler patent to secure this extreme degree of flexibility by carrying those slits all the way from the forward end of the part 42, to the base of the piston. I have already demonstrated here that when you
702 put that ring on, and remove that flexibility then if we make the rest of the parts accord with the patent, it works properly. It would work in that same desirable way if the slits were short instead of long, without the brass ring on the outside.

Going back to the matter of the clearance or fit as between the head of the nipple—There is a very slight

latching effect as we slip the coupler over the fittings. This has been given an accurate close fit by Mr. Fox. That same kind of latching effect can be duplicated in a coupler which does not have spring fingers by giving it a sufficiently close fit so that the slight give of the
371 leather at the back, together with the squeezing out of the grease film, and the slight yieldability of the grease due to the entrained air will cause the latching.

703 Q. If the cylinder of the Defendants' Exhibit 61 device be lengthened slightly by unscrewing the cap a turn or two, does the tightness of that latch as between the fitting and the coupler become affected?

A. Yes, it becomes less and less, and in the same way we could put this brass ring on the spring fingers and then by screwing the cap piece back and forth secure the proper adjustment so that we would get the same kind of an effect.

Mr. Koenig: Was that latching done under conditions of pressure in the gun or under conditions of no pressure, in this demonstration you just made?

The Witness: That was done under conditions with no pressure in the compressor, and all the last discussion about this has been directed to that kind of a situation.

Mr. Williams: Q. Now, do the dimensions which Mr. Fox has given to these various parts of this Defendants' Exhibit A-61 appear to have been worked out closely to show such inoperativeness as appear to have been demonstrated, or have they been given such dimensions ap-
704 parently as would correspond with the disclosure of the patent and the operation described in it?

A. These dimensions, whether by accident or otherwise, are very closely chosen to allow the cap just barely to be screwed on, and then not to let anything move to allow the operation and not to allow the movement shown in the drawing of the patent.

Q. What is the effect of the particular relationship between the diameter of the head of the fitting of Defendants' Exhibit A-61 and the position which the flared out
705 fingers of the coupler part have, insofar as Mr.
372 Fox's demonstrations of operability were concerned, where the fingers were very flimsy as without the brass ring, and the lack of operability when they were stiffened by the addition of the brass ring.

A. The fingers are flared out, as I measured it, about 13/1000 of an inch, that is a little less than 1/64 of an inch. That is just about sufficient to let the fittings go into the coupler without hardly flexing those fingers at all. But those fingers flex so very easily as to permit the fingers to bend through quite an arc; for example, that shown in the defendants' chart Exhibit C-21. If they were free to flex that much upon hand pressure, then upon the introduction of grease pressure over that comparatively large piston, which has an area of probably nearly—perhaps more than one square inch, then we would have a tremendous pressure there and those springs, those fingers, would simply splay out and the force which they transmitted would be increased only very slightly.

I don't know whether this is the point at which to go into it, but the force which any spring exerts is proportional to the amount it has been deformed. Hooke's law is that stress is proportional to strain. If you are weigh-
706 ing a block of ice that weighs fifty pounds the scale goes down to the notch fifty. If you weigh one that weighs one hundred pounds it goes down to the notch one hundred, which is twice as far, and conversely. So that here, as the piston moves toward the jaws so that the fingers are, let us say, expanded outwardly 1/32 of an inch, that will produce some certain degree of force. If they are then expanded outwardly 1/16 of an inch it will be twice as much force, and so on. If those fingers were made so very flimsy and were made straight so that they had to move some considerable distance, and were made flimsy enough to do that by hand, then when you got the grease pressure on they would go down all the way to the base, and then, of course, they would not be effective to increase or tighten the grip.

373 Now, that tightening of the grip is absolutely essential to the Butler patent and its operation, and that is because of the fact that the Butler patent shows this rather peculiar tulip-shaped head with the sloping shoulder. It is not a straight shoulder on the under side. It is a sloping shoulder, and that means that the disrupting tendency causes those jaws or segments 40 to be pushed outwardly against that shoulder which is sloped.
707 That, of course, drives the jaws outwardly. If they are

flimsy springs and they have gone to the limit of their movement down so that they are hitting the bottom, why if those springs are so weak that you can get them down by hand, then certainly the grease pressure would be more than sufficient to blow it off unless the pressure were tightened; and that tightening can be affected only by making those fingers stiff enough so that, at the pressure which you desire to handle, the fingers have not abutted the peripheral flanges of the segments 40, because when they make that abuttment of course no further downward movement is possible and accordingly no more wedging or camming action is possible, so that the force to grip cannot be increased.

Q. Referring now to Mr. Fox's demonstrations with the A-61 apparatus and the C-21 chart and the wooden models A-59 and A-60, will you state whether any or all together accurately or fairly present the invention of the Butler patent?

A. No, I should say they don't. The model does not
708 correspond with the drawing. The drawing does not correspond with the patent. It has got these extra parts added in there. That is the inner cylinder. That is not the part 42 that I speak of. That is an added part.
374 In the drawing it is colored violet or lavender and appears to be the same color as the outer part. Of course also it should be noted that both in the drawing and in the model the thickness of those side walls is not the thickness which is shown in the patent. They have been thinned to make them springy.

Now, neither the model nor the drawings correspond with the patent. This wooden model A-59 does not correspond with the drawing. The patent does not show any thin member such as this. This wooden model does not include the element which has been added in the working model, so that when we move the parts away the sealing member, of course, is perfectly free, and this thing, if one were made like it, would not work at all. The grease would pour through the end seal and out through the fingers. The model A-60, which approximates very
709 closely the dimensions and proportions shown in the drawing, was represented as having a pencil in here back of the piston to prevent the movement backward, so that the space 50 which is shown in the patent is completely

filled up, as Mr. Fox said, with the incompressible fluid; but Mr. Fox overlooked the point that the fluid can flow back into the hose when the compressor is turned back. He overlooked the fact also it can flow forwardly and out into the fitting. The flowing out into the fitting may not be very effective when there is a check valve in place to prevent that, but the flow back into the compressor is incontrovertible; and the patent speaks of relieving the pressure, which certainly means to me that in some way by turning back the compressor, as Mr. Fox and I have both done, or by opening a valve, or in some other way, the fluid is allowed to escape. So that this incompressible fluid does not have the effect, and my demon-
375 stration proves that it does not have the effect, of this stub of a pencil placed in here.

710 Q. Now, can you with this wooden model, A-60, wholly or in some degree demonstrate what would occur in the device of the Butler patent if operated in the manner described by Butler and without this pencil, this lead pencil effect that Mr. Fox invoked.

A. Now, this model, of course, has these side guides on here, so that there is no possibility of doing any wobbling with this coupler with respect to that fitting. In other words, you approach it straight or not at all. And as we move the coupler forward the jaws, because of their binding engagement here—these are made of wood. If I could grease this, or, of course, in a metal machine, these jaws will slide outwardly very easily. I think that by wobbling slightly I can show how they do pass over the head of the fitting. Then as the pressure comes on
711 the piston moves forwardly. To some extent the coupler pulls back, and the jaws are wedged between these two parts, one part on the cylinder and one on the piston, to clamp the coupler to the fitting to prevent the disruption. Now, then, I relieve the pressure, as Butler says, which means to me that the grease can flow out of this space 50. I don't know how else the pressure could be relieved. And if then we pull the coupler back, the tulip-shaped head here forces the jaws outwardly, this piston is pushed back ever so slightly. A slight amount of grease goes out here through this passage, that is the passage through the back of the coupler, or as we are trying to separate the parts the seal may be broken at the head of the fitting

here and then as you come back just a little bit, or by cocking at a slight angle, the pressure may flow out
376 here. Either thing may occur. Probably both do occur. There is no difficulty whatsoever in separating the coupler. The wooden parts introduce more friction to the free movement of the parts than would be found in metal parts. These little saw grooves on the parts in wood cause that friction, and of course wood has a higher
712 coefficient of friction, wood of this kind used in this way, than metal or metal parts which are all covered up with a film of grease.

Q. Can you produce and demonstrate the operation of a sample of the Butler invention which is made in accordance with the disclosure of the Butler patent?

A. Yes. I have here a board which I have clamped to the table to fix the fitting in position. There is a gauge on the board and a fitting and a relief valve in association with it. Then I have a coupler which in its general size and shape from the outward appearance accords with the drawings of the patent, and which in its inner parts corresponds quite precisely with the dimensions taken off the various parts and with the slits to give this spring finger effect carried about half-way back on this cylindrical projection. It will be observed that there is a slight latching effect here. That does not come from the springiness of these projections. They are too stiff for that. It comes from the fact that the parts have a little yield in them other than that—that is, they are small parts that have got to adjust themselves to one another, and that does give some degree of latching action.

Mr. Koenig: Will you let the record show that this
713 coupler is applied to the fitting horizontally, whereas in the former test it was—

377 A. Yes, here I have applied the coupler to the fitting horizontally, and as I screw up the compressor we develop a pressure of 200, 400, 600, 800, 1,600, 1,700 pounds. No leakage at the joint. May I have a piece of paper? I want to catch this grease when it leaks out to keep this clean. I have placed a piece of paper under the relief valve, opened the valve so as to relieve the pressure, and then back off the compressor and remove it quite easily.

Q. Does this removal which you just demonstrated

correspond with the impossibility of removal as purported to have been demonstrated by Mr. Fox? I mean on his demonstration of his presentation of Butler you observed him go through a good deal of a struggle, apparently, before he was able to remove the coupler from the fitting, did you?

A. Yes, that was so when he had the brass ring in
714 place. His struggle occurred under a situation corresponding with the situation which I have shown here where I say that the removal is effected very easily when one builds apparatus in accordance with Butler.

Q. That is the point, in other words. What is the point of what you are showing? That ease of removability?

A. Well, the ease of attachment and the ease of removability is accomplished under a set of circumstances which duplicates the set of circumstances under which Mr. Fox made his demonstration, with the exception that we have an apparatus here which corresponds very closely with the Butler patent.

When I say very closely, I mean as nearly as it can be made, with one exception, that the washer which slides down against the end of the fitting is made about 1/16 of an inch thicker. The reason for that was, if you
378 made a washer just precisely the shape and size of that shown in the patent, there was a tendency for the washer to be slowly crowded around and capped over
715 the end of the fitting, and therefore we substituted one which was 1/16 of an inch thicker to overcome that difficulty. In other respects the correspondence is as close as can be made.

The circumstances—I would just like to speak about that—under which this removal was accomplished, are these: The relief valve was opened to allow the pressure to escape from the gauge. Then the compressor was backed off, and then I pulled by pulling on the gun. What cocking I did was done in the unscrewing and pulling slightly on the barrel of the gun. It can be removed simply by pushing forwardly slightly on the coupler so as to move the parts back, to allow the jaws to clear the head of the fitting.

Q. Now, can you with this embodiment of the Butler patent as you have just produced it demonstrate the in-

tensification of the compressive clutching of the jaws about the fitting as the pressure is increased?

A. Yes. I close the relief valve and place the coupler
716 on the fitting and then screw up the compressor quite slowly until it has just begun to grip. You see on the gauge that no pressure has passed through. At that point, with my fingers, I am able to wobble that coupler on the fitting. Perhaps if I wobbled it enough and pulled it hard enough I could get it off, I don't know. I will try. The pressure now is too great to allow the removal.

Mr. Koenig: What does it read on the gauge?

The Witness: Well, there is no pressure passing into the gauge because of the check valve in the fitting
379 which does not open until sufficient pressure is realized to cause an opening of the check valve against the spring. Now, if I relieve the pressure just slightly, there we have relaxed that grip.

Now, let us go the other way. Now, I am at the condition I was a moment ago, when there has been a slight pressure the grip is slightly tightened. You can just move it. The gauge shows that the needle has moved just away from the zero to the first mark. I guess that is where it was before, showing a pressure of 50 pounds. That means that there is a pressure in the whole system back here which is 50 pounds plus the flow that it takes
717 to open the check valve. Now, at that point we can turn the coupler with respect to the fitting.

Now, I increase the pressure, it goes up there to, what is that, 500 pounds, leaking back slowly, and there I can move it, but not easily, and I can scarcely—I cannot wobble it, using the same force or even greater force than I have been using before to do that. In other words, the grip has gotten tighter. Now, if I continue to increase the pressure to 1,600 pounds that grip is just so solid that it can't be turned, can't possibly be wobbled. And I take my whole fist, and the grip is now a very, very sold grip indeed; and as the pressure goes higher than that the grip is proportionately increased. So that we see that from a very low pressure all the way up to the high pressure the grip is becoming gradually more and more strong.

Now I release the pressure, back off the compressor,

holding it directly back of the coupler. I rotated the handle of the compressor about three times.

Mr. Koenig: About ten times, wasn't it?

718 380 The Witness: The number which you counted, I think, was the number of half turns, the number of times I moved my hand each time it went a half turn.

Mr. Koenig: That would make it five?

The Witness: That is right. Then by pushing the coupler toward the fitting I am able to draw it off. By pushing the coupler toward the fitting I moved the parts back and allowed the jaws to move outwardly and removed the coupler from the fitting.

Q. Now, Mr. Butler at the beginning of the trial identified Plaintiff's Exhibit 8 as the original sample of his invention as shown in Fig. 2 of his patent, as he made it in 1921 before applying for his patent, and as the sample which he took to his patent solicitors, for the purpose of making the application for the patent in suit. Two of the three jaws had been lost, and also the nipple. Have you made up and can you produce and demonstrate a replica of this original Butler sample?

A. Yes.

Q. As you produce it will you compare it with the
719 original device offered in evidence as PLAINTIFF'S EXHIBIT 8?

A. I have here a compressor terminating in a flexible conduit leading to a coupler which is made indentically in accordance with the original sample produced by Mr. Butler, except of course that it has the two missing jaws added to it. I have now in the gauge block a fitting which is made of a shape to correspond with the fitting shown in the patent, and of the size such as to allow co-operation with this particular coupler, which is slightly
381 smaller than that shown in the patent. I had the fitting made of brass because the remainder of the parts are made of brass. Steel might be a more suitable material, and I have also a steel fitting.

Now, I place the coupler over the fitting and turn the handle to develop pressure and find that the grip is made, the pressure is coming up there, and I have 500 pounds, there 1,000 pounds, and there 1,500 pounds. Then I re-
720 lieve the pressure, back off the compressor, what? Six

and one-half turns? And remove the coupler from the fitting.

Now, that means that the statement or the understanding that this original Butler sample would not work is a mistaken conclusion. There was in this case a very slight apparent leakage of grease. That was not leakage. That grease came from the interior part of the coupler upon the initial pushing on by hand of the coupler. That is, the coupler space had some grease in it. As the coupler was placed over the fitting that grease came out. No grease, as far as I was able to observe, leaked during the compressing or grease pumping operation. Perhaps I can demonstrate that again.

Q. Supposing you pull it off now before you pump and clean up the parts, if they need it.

A. Yes. I have done so. Now, we observe that there has been no leakage of grease at a pressure up to 500 pounds. There is 1,000, and there is over 1,500 pounds.

And then I relieve the pressure at the gauge. There
382 has been no leakage up to this point at the joints.

And then back off the compressor about five turns and by a very light pull remove the—

721 Mr. Koenig: Mr. Williams, when you pulled it off did you wobble it again?

The Witness: Not intentionally. It may have wobbled, but it was loose. It can be done without any difficulty simply by, if you want to, by giving it a straight pull without any wobbling at all.

Mr. Williams: Q. In both of these demonstrations you have said, in effect, "I pull it off." The record does not show what we could all see. Won't you describe the pulling off and whether it was pulled off easily or with difficulty, or how?

A. Yes. After backing the plunger of the compressor off a few turns so as to relieve the pressure back of the piston 45, I then with the compressor in my hand pulled the compressor to a vertical position and gave a very slight jerk with perhaps the force that my thumb and forefinger would exert, certainly no more, and the coupler came off very readily.

Q. Now, in the operation of this replica of the Plaintiff's Exhibit 8 was the attachment of the coupler to the

fitting, that is the preliminary attachment, easy or difficult?

A. No, no, that was very easy. It could be done with two fingers.

722 Q. As the pressure of the grease is increased is the grip of the jaws upon the neck or throat of the fitting intensified?

383 A. Yes, it is, in precisely the same way as I demonstrated with the other model.

Q. When grease pressure is applied is there in these samples which you have produced of this Butler invention something more than a mere positioning of the jaws behind the head due to the application of the grease pressure?

A. Yes, there is.

Q. What is there?

A. There is a very sensible, by that I mean measurable intensification of the compressive clutching about the nipple. The mere positioning in and of itself is insufficient to prevent disruption of the joint, and that is because of the fact that the fitting is quite intentionally made with a sloping under-surface for the shoulder. Perhaps I ought to make that quite clear by pointing out that if the shoulder were a 90 degree shoulder, a perfectly abrupt shoulder, and if the jaws similarly at the upper ends were abrupt so that they would not be cammed outwardly, then regardless of how springy, how
723 yieldable, the fingers might be, no amount of force would be sufficient to remove the coupler from the fitting. They are not, however, shown that way in the Butler patent, nor are they that way in my models. The under shoulder has the slope shown in the Butler patent and the jaws have the upper curved surfaces shown in the patent.

Q. You said that as distinguished from mere positioning these models demonstrated a sensible and a measurable grip. Do you mean that it was barely perceptible?

384 A. Oh, no.

Q. Well, the words "sensible" and "measurable" mean what, or what is the fact?

A. Well, that the intensification of the grip is something which is very, very readily noticeable by the use, the ordinary use, of the Butler system. You feel it. It is a very powerful grip. You can feel it in your hands.

Q. Will you please compare the samples you have produced and demonstrated with Fig. 2 of the Butler patent, having reference, if you wish, to any other models or exhibits which you may find useful in making this comparison?

724 A. Yes. Now here I have removed from the Butler replica—I am sorry I haven't here the original at this moment, because the correspondence between the piston part of the replica—

(Noon recess.)

725 I now have disassembled the parts of the Butler models, that is, the one made following the drawing quite closely, and the other following the original Butler sample. I 726 also have here the enlarged half section model made directly from Fig. 2 of the Butler patent. Now, we can see, of course, the close correspondence between the original and the replica. As far as I have been able to tell they are identical, and we see the very close correspondence between the enlarged half section model and the part taken from our working model. If our working model were cut in half, as the section model has been 385 cut, it would present the section form which we see in the section parts; or looking at it another way, if we place it together with the remaining half parts it corresponds except for size almost identically with the part taken from our working model.

Perhaps I ought to point out that in sawing these two parts in two the saw itself took up some space, so that we have one "half" bigger than the other "half". However, if we allow the space for the thin saw blade, then, we have a perfect cylindrical form.

Now, as contrasted with that, let us just look for a moment at the model presented by Mr. Fox, as Defend- 727 ant's Exhibit A-61. Now, I am going to remove the brass sleeve from the piston assembly, and we see here something which not only stands up a little higher but also something which looks quite different either from the patent drawing itself or from our enlarged sectional model made directly from the patent drawings, and if we were to section, that is, to saw those in half, assuming that we sawed at some point other than through the slits we will find a section part here that's a spring finger collet which is screwed onto the base and that would

present a section, which as far as I have been able to measure, is considerably thinner than what is shown in the patent, and moreover we would find something which is not in the Butler drawing at all, and that's this inner cylinder, and of course we would see the screw threads for attaching the collet or spring finger assembly to the main body of the piston. In other words, we would have something which is not fully consistent with the patent drawing,—parts added.

386 I perhaps ought to say that the disproportionate length which appears here between the part removed from our model and the part removed from the defend-
728 ants' model, A-61, is partly illusory because of the fact that the cylinder of the defendants' model is slightly longer, that is, the internal bore is slightly longer than the patent drawing, so that by that same amount it would be proper to make the piston assembly that much longer, assuming that there were any reason or necessity for doing so. However, the piston assembly is disproportionately long by at least 3/16ths of an inch, so that except for the amount, the discrepancy in the lengths of the two piston assemblies, it does represent the real fact.

Perhaps I should point out that the piston assembly, and all the parts of our model, are consistent entirely with the drawing. There has been no need for adding parts. Furthermore, this construction, that is, our construction is entirely consistent with everything within the language of the specification and claims. Our construction does not violate either the spirit of the drawings, the drawings themselves, or the strict language of the specification, or the mode of operation set forth there; and on the other hand the defendants' construction is very clearly not in accordance with Fig. 2 of the Butler patent. The remainder of its operation in so far as the
729 spring fingers maintain the compressive clutching and give the wedging action, in that respect the operation, of course, is as set forth in the Butler patent. It is equally so, in my opinion, when the brass sleeve is put in place and when sufficient room for movement of the piston assembly is given.

387 (Plaintiffs offer in evidence the second halves of PLAINTIFF'S EXHIBIT 40 just referred to by the witness, as PLAINTIFF'S EXHIBIT 40-A.)

Q. In the Alemite hydraulic coupler is there any yield or give between the actuating piston and the actuated gripping jaws?

A. Why, there is some, not a great deal. The piston is composed of several *v* leathers or else a rubber washer. The grease presses on the upper side of that packing member, on the upper side of the packing member seen in Plaintiff's Exhibit 33 and as found in the actual construction. Now, that packing material, of course, is deformable. It can adapt itself materially and may flow so that one side of it may be pinched down tightly and the other side extended upward by somewhat so that one jaw will progress more forwardly with respect to the fitting than the other, too. In that respect there is the
730 interposition of a yielding material between the force of the grease and the jaws which make the grip on the fitting. Also, of course, there is a certain amount of yield in the fact that these are small parts that don't fit entirely accurate and there is some incidental amount of give in that respect, but I should say that that was of little consequence as compared with the very definite yieldability of this packing material.

Q. The sum and substance of Mr. Fox's discussion and argument relative to the Butler patent seemed to me to have been epitomized in his chart C-21. This was provided with a caption reading "Defendants' models
388 prove Butler coupler is inoperable without spring fingers". Mr. Fox's argument was, as I understood it, that a large amount of springy give or yield must necessarily be incorporated between the actuating piston 45 and the radially actuated jaws 40. This was for the reason, as Mr. Fox contended, that the whole device would be inoperable if the means for transmitting the force of the grease pressure to the locking elements were relatively stiff and unyielding. I should like to ask you in this connection, first, whether you agree with the contention that the operability of the Butler invention is de-
731 pendent upon a large amount or indeed any amount of give or yield in or about the means for transmitting this force.

A. No. In my opinion, as verified by my demonstrations and experiments, it is not true that the Butler

coupler is inoperable without spring fingers. The model made by us illustrates that a very slight amount of yield will still provide a perfectly operable and satisfactory construction. The demonstration with the replica of the Butler original model Exhibit 8 shows that only the very tiny amount of yield which may exist in the solid cylindrical projection still gives a construction which is entirely operable and satisfactory. Accordingly, I don't agree with Mr. Fox in this respect.

Q. I should like to ask you whether there is anything in or about the specification or drawings of the Butler patent which limits it to a flimsy or easily yieldable connection between the actuating piston 45 and the radially actuated jaws 40?

389 A. No, there is nothing of that kind in the Butler patent.

732 Q. I should like to ask you whether there is anything in or about claim 2 of the Butler patent which limits it to the construction in which there is a large amount of yield or indeed any yield whatsoever in the connection between the actuating piston 45 and the radially actuated jaws 40?

A. No, there is nothing in claim 2 which refers to spring fingers at all, or to any amount of yield.

The mechanical or engineering principle on which the Alemite hydraulic coupler compresses the jaws of its chuck about the bearing nipples is no different from that relied upon in the Butler patent. The principles are identical.

Q. As I understood Mr. Fox's testimony he endeavored to make the point that the space between Butler's inner cylinder 42 and the outer cylinder or shell was provided to accommodate the large radial movement of the spring fingers. Do you agree with him, and will you give the reasons for your answer?

A. No, I don't agree with him. In the first place, there is nothing in the specification that refers specifically to that space or suggests or tells what the purpose of it is. Certainly nothing says that it is for the purpose

733 Mr. Fox ascribes to it. There is, very plainly a purpose in having that amount of space. These jaws must move outwardly and there has got to be room to allow them to

move. Now, if that space were reduced in diameter
390 there would be no place or any sufficient place for the outward radial movement of the jaws to allow release of the fitting.

It might be argued—perhaps I should not say that—it would be possible to provide space for the outward movement of the jaws by cutting a peripheral groove by an under-cut so that the flanges on the jaws could move out into that groove, but that's the hard way of making something, and the very simple way is to cut the bore right straight down of a diameter large enough to accommodate those jaws, and that is certainly a sufficient reason to explain why that diameter is made what it is.

Q. In describing the means by which the pressure and force of the lubricant is transmitted to the gripping jaws Butler's specification says in one place, namely, line 107 of page 2, that the segments 40 "are held in position on the throat," and I will interpolate, of the nipple "by the spring fingers 42." Is there anything about this language which specifically determines or fixes
734 the relative stiffness of the so-called spring fingers 42?

A. No, there is not. I would like to say in that connection that in talking about the other figures, Fig. 3 and Fig. 4, the patent does tell what kind of a spring is to be provided, that is, just what it is to accomplish. So that here in that single reference to the spring fingers, and that's the only reference there is to it in the patent, that's the only thing we have to go by to tell us how stiff or how weak those spring fingers should be except as we resort to the drawing and to the patent as a whole and apply the principle or ask the question, how strong
391 should the spring fingers be? And answer it by saying: Strong enough to do the job that they are called upon to do, to transmit the force into a clutching compressively of the jaws about the nipple.

Q. Is there anything about the drawings or specifications or the claims of the Butler patent which excludes a construction in which these parts are of such a stiffness as to provide a substantially unyielding wedging action between the means of transmitting the force of the grease and the jaws against which this force is to be exerted?

A. No, there is nothing which excludes that kind of a construction.

735 Q. Is there anything in or about specification, drawings or claims of the Butler patent which limits Butler's invention to such a yielding compression as has been demonstrated by Mr. Fox rather than by relatively stiff fingers or by relatively rigid inner cylinders not slitted into spring fingers at all?

A. No, there is nothing about the patent in any respect whatsoever which limits the invention to the very yieldable spring fingers or, indeed, to spring fingers having any substantial yield whatsoever.

Q. In so far as the invention claimed by Butler is concerned, is there any essential difference between the compression of spring fingers, that is, elastic members which yield under stress, and return to normal when the stress is removed, and compression by wedging or camming action?

392 A. No, within the limits in which the spring fingers are functional and operative there is no difference whatsoever in the transmission of force. It is simply the old application of Hooke's law, the more you bend the spring finger the more force it will transmit to the jaws up to the point where it reaches the limit of its movement, and then of course no further pressing is go-
736 ing to increase the gripping. As a result, if we get to high pressures beyond those of which that grip will hold, the coupler will come off the fitting and, of course, be unsatisfactory in that respect.

Q. Do you agree with Mr. Fox that in the Butler construction there is wedging or camming action between the inner cylinder 42 and the radially movable locking jaws regardless of how relatively stiff or how relatively yieldable the member 42 may be?

A. Yes. I think Mr. Fox is correct in that up to the point where the spring fingers abut against the end, the action which forces the jaws inward is a camming or wedging action.

Perhaps we might consider these jaws as being something like a conical plug, and with respect to the projections, or projection, from the piston you may consider that the jaws are being forced into that confined space; or looking at it in another way it amounts to the same thing, the piston is being forced over that plug and tending, of course, to contract the plug and the plug is made of segments spaced slightly one from the other so that

it can and does contract about the nipple so as to clutch it inwardly and to hold it in place, or to hold the coupler in place.

737 393 Q. If the cylinder or spring fingers 42 were made so yieldable as to be forced easily to the limit of their movement where they abut the flanges of the jaws, would it be possible to obtain sufficient gripping to hold the coupler in place on the fitting?

A. No. I think perhaps I can explain that. The under-shoulder is sloped, and the disrupting tendency pushes those jaws outwardly as they ride up on that sloped part on the under side of the head of the fitting, and that of course would expand the weak fingers outwardly to grip,—well, the mere positioning would not be enough, the gripping would not be enough, and depending upon the weakness of the spring fingers it would take little, or a little more pressure to break the joint. If the fingers are very weak a very little pressure will disrupt the joint if they are stronger a higher pressure will disrupt the joint.

Q. I would like now to have you turn to a consideration of the Lincoln Company's Kleenseal fitting. In that connection Mr. Fox testified in effect that the Lincoln Kleenseal fitting with its head, shoulder and peripheral groove was designed quite regardless of the Alemite hydraulic fitting and the Alemite hydraulic coupler, but
738 solely with the idea of producing a fitting which would cooperate with the plaintiff's Alemite Zerk nozzles and with the Lincoln Company's needle nozzles. Will you please state whether in making a fitting which would cooperate with the Alemite Zerk nozzles and with the Lincoln needle point nozzles it was necessary to produce a fitting which would cooperate also with the Alemite hydraulic coupler?

394 A. In order to show that I would like to have the cut-away Zerk nozzle, I don't know the exhibit number, the defendants produced it, and also one of the defendants' N-1 nozzles.

(Plaintiff offers in evidence the replica of Mr. Butler's original sample, Exhibit 8, as PLAINTIFF'S EXHIBIT 62.)

(Plaintiff offers in evidence the sample produced by this witness of the Butler construction as shown in the Butler patent, as PLAINTIFF'S EXHIBIT 63.)

739 A. I just wanted to point out that the single jaw which is still with the original Butler sample appears to me to be intentionally rounded on the bottom side so as to permit a little rocking to remove the fitting. I don't think that it has been worn as Mr. Fox, as I understood it, suggested. I say that because of the fact that the tool marks are still present, and if there were wear sufficient to cause that curvature those tool marks of course would have disappeared. I have incorporated that little rocking or dishing shape into the replica of Butler's original sample.

Q. And that was done how, by wear or by tooling?

A. No, no. It was cut that way on a lathe.

Q. And does that dishing shape of the forward ends of those jaws interfere in any way with the operation, or does it promote smooth operation?

A. It certainly does not interfere with it, and I think probably it helps a little bit. The tops of the jaws can
740 rock outwardly and work easily over the head of the fittings upon removal of the coupler.

395 In re-assembling the parts of the model which I have demonstrated I have noted that the cap and the jaw assembly of the defendants' model is marked with the numeral 4, and in that way I identified it as a part of the defendants' exhibit which is marked on the main body part of the coupler also with the numeral 4.

Mr. Williams: I think it may be understood that the fittings used in conjunction with these several models are included as parts of the exhibits. Perhaps we had better mark in each instance the fitting with the numeral number 62 or 63, but with the sub-letter A. Plaintiff's Exhibit 62 includes the compressor, coupler, and the fitting with which it was used, and is marked Plaintiff's Exhibit 62-A.

Plaintiff's Exhibit 63 includes the fitting which was part of that demonstration apparatus and is marked Plaintiff's Exhibit 63-A.

741 Q. Now, in answer to this question as to whether in making the fitting which would cooperate with the Alemite Zerk nozzle and with the Lincoln needle point nozzles, it was necessary to produce a fitting which would cooperate also with the Alemite hydraulic coupler. You asked for Defendant's Exhibit A-47 and Defendant's Exhibit A-40, and here they are.

A. Now, as I understand it, Mr. Fox testified that the Lincoln Company desired to have a fitting which had a curvature on its head which would conform to the radius of the Zerk nozzle of the size put into the field by Alemite. That radius was 1/8th of an inch, or a sphere like that would have a diameter of 1/4 of an inch. Now, there is no reason why a fitting of that kind cannot be made
396 perfectly satisfactory, which however, has a body diameter greater than 1/4 of an inch by an amount so that the Alemite hydraulic coupler will not slip down far enough to give any grip on the fittings.

Now, the spherical contour of the heads of these fittings conforms with the spherical contour of the Zerk nozzle, and of course we get all the angularity which you can get with the Zerk fitting—Zerk nozzle, excuse me,
742 on a fitting of this kind. That's because of the fact that each part, that is, the fitting and the nozzle has in it a hole of about 62 thousands of an inch diameter. Now, when we move this at an angle that hole, of course, is closed, the registry between the holes is obviously closed and no grease could come through no matter what you did, and that closing takes place long before there is any interference with the angling between the flanged skirt of the Zerk nozzle and the main body of the fitting. Now, that body is only 1/32nd of an inch larger than the standard Lincoln Kleenseal fitting.

Mr. Koenig: Is that radius or diameter?

A. The diameter of the body. The radius of the head is 1/8 of an inch, to produce a 1/4 inch sphere to cooperate with the Zerk nozzle.

Now, of course, it would be possible on a fitting of this kind to cut a groove with a skirt of an N-6 nozzle type somewhere below this enlargement, and we could get the necessary degree of angling.

Now, that is one form in which this result could be accomplished. Perhaps I should say also that it
397 would be perfectly possible to make a collet of the spring clip type shown by Fox which would cooper-
743 ate with this larger diameter. The collet would be simply a little bit larger, 1/32nd of an inch larger.

Now, these fittings also cooperate with the N-1 nozzle to get the contact between the needle and the hole and the guiding effect on the N-1. Perhaps no guiding effect was ever claimed for it, but it is just the same as on

the Lincoln Kleenseal fitting as it eventually turned out to be made. That means that here is a nozzle. This nozzle also guides on this fitting, in this fitting in about the same way as it guides on a Zerk fitting, or on an Alemite hydraulic fitting, for which, as I understand it, it was intended. The guiding might be slightly inferior because of the curved head. If that is found to be the case the head might be flattened somewhat and still not produce the edge or line contact, which is called for in the Zerk patents which apparently the defendants sought to avoid.

Q. Now, before you go further with this fitting that you have just been talking about, does it cooperate with the Alemite hydraulic compressor and nozzle, this one of the larger diameter?

744 A. No, it will not except insofar as the manual holding of the nozzle may affect the Zerk type connection between the sealing element and the contour head of the fitting. That will allow some pressure to pass, but for use with power equipment, or even for hand equipment, it would not be satisfactory. Here I am pumping, or developing a very small amount of pressure. By jerking it I can 398 get the needle to go up to 2,000, but the maximum I am able to produce here is a thousand pounds and with a very substantial leakage of grease, not commercially satisfactory.

Perhaps I can show that. Now, this hand gun, of course, or any hand gun, does transmit some hand pushing of the inner sealing element against the end of the fitting, and that will be effective to produce some degree of sealing. Not enough, however, to handle the pressures which seem to be required these days for greasing cars.

Perhaps I can—The point I want to bring out here is that what cooperation there may be is not Butler cooperation, it is not strictly speaking Zerk cooperation because there is no line contact, but it is push contact cooperation not hydraulic or gripping cooperation.

745 Perhaps I can demonstrate that with the power compressor which we have here. I don't know whether your Honor has seen this apparatus or not. Here in this gauge block I have two fittings, one of them a Lincoln Kleenseal fitting, and I can put the coupler onto that fitting and then by operating the valve secure—

Mr. Koenix: Q. Was there a leakage about that fitting, Mr. Williams?

A. Yes; a very substantial amount. The leakage occurred because I failed to put the coupler far enough onto the fitting and it did not get into the groove where the grip is made.

This time I will see if I cannot put it on. I think I have done so. Here we have a pressure of 4300 pounds without leakage.

399 Mr. Williams: Q. Can you demonstrate effectively there the fact of the gripping, the Butler gripping before you remove the coupler from the Kleenseal fitting?

A. Yes, I think so.

746 Now, the power is on, that is, the grease pressure is on and I can pick up the whole gauge and the grip is tight enough to hold it even though there is a tendency for it to swing out of the horizontal plane.

Q. Now, you have released the pressure, have you, and removed it?

A. Yes.

Q. Just try, if you will, to tell what you do as you go along.

Mr. Koenig: Q. When you removed the nozzle from the Kleenseal fitting did you angle it substantially?

A. Yes. Now, I attempt to put the hydraulic coupler onto the larger diameter fitting, and you see that the jaws won't enlarge to go over the large part of the fitting. Then, I turn on the grease. That time the whole thing slipped and caused a leakage that way.

Mr. Williams: Step up there, one of you and hold the electric connection. Let Tom hold that, and you hold the thing there a little bit, Mr. Wupper.

A. (Continued) Then, if I turn on the grease the pressure blows the grease all over. That seemed to produce a pressure of something under 1,000 pounds, and

747 that came from the surge of grease which passed through by means of the Zerk or push contact as I held the

400 coupler in position. I have tried that holding just as hard as I could in much better positions than this, and it is not at all satisfactory. There is almost always leakage at a pressure only as high as this, 4,000 pounds or thereabouts. Now, that means that here is a fitting which accomplishes all of the results which Mr. Fox's

company apparently sought to accomplish, with the exception that it does not in this form permit of any angling of an N-6 type nozzle.

Q. Does it accomplish the result of effective cooperation with the Alemite hydraulic coupler and compressor?

A. No, it does not. Some grease goes through, but it is not because of cooperation with the gripping parts. It is the Zerk push.

Q. Well, whether it be the Zerk push or something else, is it possible with this larger diameter fitting to accomplish satisfactory and effective cooperation with the Alemite hydraulic compressor and coupler?

A. No, I don't think it is. Now, perhaps we had better mark them.

748 (Plaintiff offers in evidence the larger diameter round head fitting as PLAINTIFF'S EXHIBIT 64.)

Q. That's the only one you have used so far, is it not?

A. Yes. Now, the same thing could be done with a fitting which is about a 32nd of an inch smaller in diameter. Here we have one with the spherical end suitable for cooperation with the Zerk nozzle. It gets all the angling that that combination ever can produce. It
401 works with the N-1 nozzle, not so bad for guiding onto the fitting. It will work, of course, with a spring collet, and perhaps without going through all the demonstration it will be apparent—well, perhaps it is not apparent that it will not cooperate satisfactorily with the Alemite hydraulic coupler. That's because of the fact that there is a limit to the outward gripping movement of the jaws, and this is within that limit. In other words, the jaws just barely make a contact with that surface and don't accomplish substantial gripping.

Let me just demonstrate that quickly. This time I am going to wind a rag pretty close around this so that the grease won't spatter over the courtroom as I am afraid
749 it did a little bit before. Then, when I turn on the grease again I get a substantial amount of leakage and no substantial pressure into the fitting where it is desired.

I don't know whether your Honor saw this, but before I started this was all clean and I guess you saw perhaps a teaspoonful or two teaspoons full of grease around the fitting, and the pressure which was produced was less than 1,000 pounds per square inch and not satisfactory for proper or adequate cooperation.

Q. With what?

A. With an Alemite hydraulic coupler. Here is a fitting which will cooperate with the Zerk nozzles, cooperate with the N-1 nozzle. If you make a collet clip to go on it, it will do everything that the Lincoln Company apparently wanted to do except, again, to produce satisfactory angling with an N-6 type nozzle. It will produce
402 some, particularly if that N-6 nozzle is not carried too far onto the body, that is, the skirted part.

Q. You say it will do everything they wanted to be
750 done. Do you include or do you exclude cooperation with the Alemite hydraulic?

A. I don't know whether they wanted to do that or not, but it won't do it.

Q. It will not cooperate?

A. No.

(Plaintiff offers that last demonstration fitting in evidence as PLAINTIFF'S EXHIBIT 65.)

A. (Continued) Now, if this matter of getting an angling fitting with the N-6 type nozzle is of importance, it is a very simple matter to provide a groove in the fitting of the type I just demonstrated, that is one which cooperates with the Zerk and with the N-1 and with the collet, if one is desired, and to make a slightly different nose piece, that is, a smaller diameter, and get the guiding and the cooperation of that inturned-skirt with the groove. That I have tested. That gives as much angularity as the N-6 nozzle on the Kleenseal fitting. The guiding is substantially the same. It can be placed on
751 easily, taken off easily and, again, this does not cooperate satisfactorily with the Alemite hydraulic coupler.

Q. Perhaps with some one of those or some others you had better demonstrate the cooperation with, perhaps, an Alemite Zerk type nozzle and the Lincoln Kleenseal nozzle N-1 and N-6 and then show as you have before the effect when attempted to be used with the Alemite hydraulic.

403 A. All right. Perhaps, if I get the last fitting I have here out before then we can run the two tests simultaneously and save a little time.

Here is a fitting which has the same diameter as the last grooved fitting, which I have just shown. Its groove, however, has been moved to a more advantageous position. It will be apparent that the angling of the N-6 type

nozzle pivots about a center which is provided by the needle projecting into the hole on the end of the fitting. Perhaps, the drawing will show that.

(Plaintiff offers in evidence the first of the two fittings
752 we have just been talking about, with the groove and small diameter, as PLAINTIFF'S EXHIBIT 66; and the last one with the groove moved toward the head, as PLAINTIFF'S EXHIBIT 67.)

Mr. Koenig: Q. The groove in the second one seems to be of a different form than the first. Will that be confusing later if there is another?

The Witness: I intend to develop that.

A. (Continued) Let me just with this drawing for an instant show what I meant about the location of this groove. Here, if this is the center about which this angling takes place, and I am pointing to the hole in the end of the fitting with the needle projecting into it, then the radius about which the inturned skirt lip moves is the distance from that center to the lip. Now, if the groove is placed, let us carry it to an extreme, way down near the base of the fitting, then only a slight angularity will cause this skirt to move quite quickly against the bottom of the groove; conversely, the farther we carry this
753 404 groove out toward the head of the fitting the less movement there will be into or out of that groove for a given degree of angularity.

Now, that suggests to me that a more propitious, a more advantageous place for the location of the groove—

Mr. Williams: Q. Now, for what purpose?

A. For the purpose of angling with the N-6 type nozzle, is not well back on the fitting but out somewhere near the end as, for example, as shown on the fitting of Plaintiff's Exhibit 67. And if we put on another nose piece of the N-6 type which cooperate with that location of the groove, we get even more angularity than was obtained in the form I have just shown, which produces an angularity more than sufficient to allow lubrication, an angularity as great as the angularity the Lincoln Company achieved between its N-6 nozzle, as it now makes it, and its Lincoln Kleenseal fitting, as it now makes it.

754 I might point out that that angularity is an angularity greater than can be sealed by the use of this internal needle nozzle. That is, some time before you get to this maximum of movement permissible there is usually leak-

age developed between the needle and the hole in the fitting. Perhaps if I can take a protractor I can measure this. Well, maybe that is not necessary. This test shows that it is about thirteen or fourteen degrees where leakage occurred.

Q. You said during the course of this last answer something like this, that if now we take a skirt or an outer shield. Is that something that you produced and contributed here?

405 A. Oh yes. There is a nose piece which is adapted for proper cooperation with the fittings of Plaintiff's Exhibit 66, and there is another nose piece which is adapted for proper cooperation with the fittings of Plaintiff's Exhibit 67.

Q. Those are things that you had made and produced here, are they?

A. They are.

(Plaintiff offers in evidence the one that goes with 66
755 placed on top of the bag containing the fittings as PLAINTIFF'S EXHIBIT 66-A.)

(Plaintiff offers in evidence another which is adapted for use with the fitting 67 as PLAINTIFF'S EXHIBIT 67-A.)

The Witness: Now, just briefly I can show the cooperation of the fitting on Plaintiff's Exhibit 67 with the Lincoln Company's gun equipped with the nose piece of Plaintiff's Exhibit 67-A. I observe, first, that the centering or locating is perfectly satisfactory, the approach of the fitting just holding the end of the gun loosely; the needle locates and the development of pressure also is perfectly satisfactory. There I have a pressure of 6500 pounds. I could go higher, I guess. And it is possible at that pressure to secure a substantial degree of angularity or build the pressure,—there I have reached the maximum.

Mr. Koenig: Is the pressure building up while you pump angularly?

A. No. It is less. About the same. I can build it up. There it is building up. Well, let's start it at the
756 bottom. At zero. I have developed, first, by a
406 straight-on application a very high pressure. Now, let us put the nozzle on the gun at an angle, and here I have a substantial angle and have developed a pressure of 3500 pounds, and there is a slight amount of leakage,

but very inconsequential, less than half a pea, and that was done when I worked toward the maximum angle which could be achieved, and that angle was as great, and in my opinion probably greater, than that demonstrated yesterday, was it, by Mr. Fox in showing cooperation of the N-6 with the Kleenseal fitting. This, of course, works on the N-1 nozzle. I don't know that there is any need to demonstrate that. It does not locate as easily as the N-6 but locates satisfactorily.

With the Zerk nozzle also I can develop some pressure, and without any substantial leakage.

Mr. Williams: Q. Can you develop as much pressure with the Zerk nozzle as you can, or as one can, with the Lincoln Company's standard Kleenseal fitting?

757 A. Yes, the Zerk gun, this compressor, when used with a standard Lincoln Kleenseal fitting will produce identically the same pressure as when used with this fitting, Plaintiff's Exhibit 67, assuming that the circumstances, the forces applied, and the like are the same.

I will just demonstrate it. There, I have reached a pressure of 2500 pounds, 3,000, 3800. I don't know whether I can get more or not. I doubt it. 3800 is about the maximum. There is no substantial leakage. I would say virtually no leakage. Less than a quarter of a pea, and the Alemite hydraulic coupler, of course, does not

758 operate satisfactorily on a fitting of this kind be-
407 cause the diameter is too small to allow any substantial gripping of the jaws. That can be seen without putting so much grease through it that the jaws are held advanced by the spring so that they are contracted.

Mr. Koenig: Mr. Williams, may I ask how far you push that on when you apply the coupler to this Plaintiff's Exhibit 67? Do you push it away down to the hexagonal portion?

The Witness: It doesn't make any difference how far down you push it, it won't hold.

Mr. Koenig: Suppose you don't push it so far. Would that make a difference?

The Witness: No.

Mr. Koenig: Would you try it?

The Witness: Yes. I just put it barely over the head, and the diameter is just too small to allow the grip.

Mr. Koenig: And what happened?

The Witness: Oh, the grease flows all over. The pres-

sure that is transmitted is inconsequential, not sufficient to allow satisfactory greasing. Now, I don't think it is necessary to go through this with the Plaintiff's Exhibit
759 66. The operation is substantially the same. Now, with this Plaintiff's Exhibit 67, here again we can make a collet which will form a friction grip on the fitting. That collet, of course, would function in the same way, would function in the same way as it functions on the Lincoln Kleenseal fitting. There is one thing to notice about this fitting that I have not mentioned, and that is that on the under side of the groove a portion has been sloped away. That is done because with this it is possible to obtain so
408 much angularity with the N-6 type nozzle that the forward edge of the N-6 type nozzle would abut the lower edge of the groove if the groove were made with an abrupt shoulder instead of a sloped shoulder at its bottom edge. On the other hand, Plaintiff's Exhibit 66 has a groove of the same dimensions and the same shape, that is except for its circumference and diameter, as that of the Lincoln Kleenseal fitting. The groove is deep enough to permit the same amount of angularity.

Now, perhaps we had better mark this little nose piece. It is going to get lost if we don't. 66-A. That is the one that works with 66.

Mr. Williams: Q. Several times this afternoon you spoke of the spring collet. Do you mean by that the thing that was sometimes referred to in the record as the frictional snap-on cap manufactured by the Lincoln Company and a sample of which is in evidence as Defendants' Exhibit A-43?

A. Yes, I do. Now, here I have a rather striking demonstration of the location of the groove in the Lincoln Kleenseal fitting. Would you hand me a gun that hasn't got any grease in it? Here in one end of this handle I have a fitting which is made without a groove, which has been blackened by Parkerizing. It is round-headed and straight-sided. The diameter of the body is ¼ inch. The diameter of the spherical head is ¼ inch. In other words,
761 it is identical with the Lincoln Kleenseal fitting except that it does not have that groove.

Now, examining that fitting one can see a shiny ring slightly beyond the end of the radius of this spherical
409 cap. Now, that ring was produced by taking a hydraulic coupler and putting it on without any grease

pressure, but just putting it on and twisting it, and the jaws hit on that line and produce that shiny groove. And here I have a little, short brass gauge with a notch in it which one can place against that fitting to observe that the notch corresponds with the location of the shiny line. So also the groove on the Lincoln Kleenseal fitting corresponds with that mark made by the jaws.

Now I am going to remove the Parkerized fitting and substitute one which is unmarked, hasn't been used, and just show how that line is produced. Then I place it within the hydraulic coupler at the point which it natur-
762 ally assumes, with the head against the sealing element, and then twist the gun and coupler with respect to the fitting, as I am doing now.

Mr. Koenig: Is this a coupler with a needle in it, or a coupler without a needle?

The Witness: This is a coupler of the type made in 1934 before we brought out the needle. And we see here this shiny line in its accordance with the groove on the Lincoln Kleenseal fitting.

(Plaintiff offers in evidence this demonstration apparatus, including the Lincoln Kleenseal fitting at one end of a handle, the blackened round-headed straight-sided fitting at the other end of the handle, and the templet or gauge, and the duplicate of the round-headed straight-sided fiting originally black and marked with the line, collectively, as PLAINTIFF'S EXHIBIT 68 and the several parts, seriatim, identified as follows: the handle A, and the Lincoln Kleenseal fitting as B, the first of the two blackened fittings as C, the second of the black-
763 410 ened fittings as D, and the templet as E.

The Witness: Perhaps I haven't said, and should say, that this fitting, this is the grooved fitting, is a Lincoln Kleenseal fitting.

Mr. Williams: Q. Now, relative to the matter of the shape of the groove in the Lincoln Kleenseal fitting, is that a desirable shape or an undesirable shape from the standpoint of its co-operability with the Alemite hydraulic coupler?

A. Well, the shape is in general a desirable shape. I don't think it is as good as the spherical contour that we have on the Alemite hydraulic fittings, but the upper side of that groove is cut in and not perpendicularly but at an angle of 30 degrees. That is advantageous in al-

lowing removal, camming up of the jaws. Perhaps of more importance than that is the fact that the back shoulder, the side of the groove toward the base or screw threaded end, is rather abrupt. It has a 5 degree angle in it only. What that means is this, that when we slip the hydraulic coupler over that, instead of having its jaws push all the way down toward the bottom of the fitting and then snap up with a bang into the groove, and pos-
764 sibly go so far as to break the fitting, the movement of the coupler downward is stopped by that 5 degree angle at the bottom of the groove.

Now, here I have a drawing to the same scale of the Alemite hydraulic and the Lincoln Kleenseal fittings, and one can see the correspondence between the parts where the grip is made; that is the groove in one case in the Lincoln Kleenseal fitting and the curved, spherical
411 part of the Alemite hydraulic fitting.

Now, there is something which I forgot to mention and which I do want to mention about these small diameter fittings, those which are 1/32 of an inch smaller in diameter than the Lincoln Kleenseal fittings, and that is this, that the smallest diameter which results from putting that groove into those small diameter fittings is larger, or as large, as the small diameter of the Alemite hydraulic fittings. The point of this is that those fittings, these are Plaintiff's Exhibits 66 and 67, are adequately strong for the service into which they are—for the service which is expected of them. This diameter, this narrow diameter, the narrowest diameter of the head of the Alemite
765 hydraulic fitting seems to be strong enough so that with hundreds of millions of them sold we have not had complaints on the basis of breakage. Similarly, and with even more force, there is a little likelihood of breakage where the groove is cut into the smaller diameter fitting because the base of that groove is just as big as that throat on the Alemite hydraulic fitting, and moreover that groove is located at a point closer to the head, in either form 66 or 67, than this reduced part of the Alemite hydraulic fitting, so that there is less moment to break the fittings off at that thinnest point. Particularly this is true of the fittings of Plaintiff's Exhibit 67 where the thinnest part is away out near the head so that the fittings will not easily be broken off.

Of course, the wall thickness depends upon the bore

on the inside of the fitting. I don't know whether we have here any drawing showing the way the holes or bores are put in these fittings. In general, the hole 412 is small out toward the business end and goes in two or three steps to a larger diameter at the screw-threaded end, so that again, the nearer we put this groove toward the head the thicker the wall we have. As we come down here the whole wall, because of the internal 766 bore, is thin. That means to me that the natural thing to have done in designing the Lincoln Kleenseal fitting, without regard or without desire to have something that would cooperate with the Alemite hydraulic, would be to take a smaller diameter and then to move the groove out closer to the head to get greater angularity, greater strength, and a perfectly satisfactory operation with everything except the Alemite hydraulic coupler. This is 67.

Q. Relative to these fittings which you have submitted and which have been marked Plaintiff's Exhibits 66 and 67, is this particular 30 degree, 5 degree angle at the sides of the groove at all necessary for use in conjunction with the inturned skirt of one of the Lincoln Company's N-6 type nozzles?

A. I don't think it is.

Q. Won't you explain how it might be, how the sides might readily have some other angle?

A. Yes. It is obvious that at the point where the cut 767 begins to go into the groove, that if that were made precisely straight the N-6 skirt would go in there just as well. Similarly, if this bottom of the groove—I shouldn't say the bottom—the lower edge of the groove were of some angle greater than 5 degrees, perhaps 45 degrees, it would have no effect one way or another on the utility of the fitting with the N-6 type nozzle, and, of course, would have no effect in connection with any of the other 413 nozzles. That is the Zerk or the N-1 nozzle, which does not depend to any degree upon any groove whatsoever.

On the other hand, those changes would make the fittings not quite as desirable for cooperation with the Alemite hydraulic couplers.

Q. Would it cost more or less or the same to manufacture fittings such as you have submitted as Plaintiff's Exhibits 66 and 67, as compared with the Lincoln Kleen-

seal Company's grooved and shouldered and headed nipple?

A. Oh, I should say the cost would be so close as between the two as to be immeasurable. These fittings are usually made in automatic screw machines where the speed of cutting is very fast and the cutting parts move in against the stock quite rapidly, and they use in order
768 to form the shape what is called a forming tool. It is, in effect, a kind of curved chisel. It is simply a matter of making tools of the shape to conform to the shape of the head here, and then having them move in 30/1,000 of an inch farther than the tools move in on the Lincoln Kleenseal fitting. Those tools move so fast that you would not have to slow down your machine at all. The fittings would come dropping out at just the same speed. If anything, the additional steel scrap, which has some slight market value, not much but some, would make it a little bit cheaper to produce that kind of a fitting, that is like 66 or 67, than it is to produce the Lincoln Kleenseal fitting.

Q. Now, Mr. Fox in his deposition, to which he was referred on his cross-examination, his deposition in the Universal case, referred to the matter of stock drills,
414 so-called, of even fractional sizes, as determining the size given to the Lincoln Kleenseal fitting, because those drill sizes were said to have determined the size of the hole in the end of the shell—I can never remember the name, the nose, the nose piece, of the Lincoln N-6 nozzle. What have you to say as to the determination of that size because of available drill sizes?

769 A. Well, in the first place, it is customary to produce metal pieces of that kind without using drills. We use forming tools, which are drills in effect, which are made specially for the particular pieces. They will have a diameter representing the large bore, and than a slightly smaller diameter representing the first shoulder, and then finally a smaller diameter to pierce and make the hole, and that is the almost universal way of producing pieces of that kind, so that the purchase of drills does not enter into it. If, however, one wanted to use drills, for example in a turret lathe or in some such way, the drills can be bought in 1/64 of an inch steps, and the difference in cost as we buy them does not exist.

770 Q. What do you mean by that?

A. Well, as we buy drills, there is no difference between a drill that is a 1/4 inch drill and one that is 1/64 of an inch smaller, or one that is 1/64 of an inch smaller than that. When you get down to the very fine drills or the very big drills, then there may be a difference in the cost, but in that range the difference is non-existent.

415 Q. In answer to questions about the 30 degrees, 5 degree side formation of the groove in the Lincoln fitting you used some drawings here. Can you say what they are?

A. Why, they are photostatic enlargements of fittings shown on General Motors standard sheets, Plaintiff's Exhibit 46-A and 45-A, of respectively the type B straight lubrication fitting and the type C straight lubrication fitting.

Q. Those being the drawings, respectively of the Lincoln Kleenseal and of the Alemite hydraulic fittings?

A. That is right.

(Plaintiff offers in evidence the enlargement of the Kleenseal fittings as PLAINTIFF'S EXHIBIT 69, and the enlargement of the drawing of the Alemite hydraulic fitting as PLAINTIFF'S EXHIBIT 70.)

771 (Plaintiff offers in evidence the Lincoln Company's compressor used by the witness in his demonstration in connection with the short nose piece, otherwise like the Lincoln N-6 nose piece, (which was offered and marked as PLAINTIFF'S EXHIBIT 67-A) as PLAINTIFF'S EXHIBIT 67-B.)

772 (Plaintiff offers the test block with a 2,000 pound
773 gauge and a horizontal heading or head, in evidence as PLAINTIFF'S EXHIBIT 63-B.)

(Plaintiff offers in evidence the test block with the 10,000 pound gauge and manifold for a vertical fitting for testing the plaintiff's model, or Plaintiff's Exhibit 9, as PLAINTIFF'S EXHIBIT 62-B.)

(Plaintiff hands the Court plaintiff's list of the prior
774 art patents relating to hose couplers, namely, Griffin, British Patent 16,086, Defendants' Exhibit A-49; Paul Patent 621,276, Defendants' Exhibit A-71; Ulleland
416 Patent 1,253,309, Defendants' Exhibit A-51; and Pinel, French Patent 327,557, Defendants' Exhibit A-69.)

Q. Does any of these patents disclose or suggest the

combination described and claimed in the Butler patent in suit?

A. Well, these patents, none of them discloses the combination of the Butler patent in general. They could be characterized in this way, that all of them call for some manual tightening of the connection. None of them,
775 of course, are for lubrication, either so intended or so adapted. There is, perhaps, this point, that ought to be made, that in couplers of this type there is, of course, the disrupting tendency. Take, oh, for example, Griffin, where the piece "C" tends to pull away from the part that might be called—I don't know which would be the nipple and which the coupler. It doesn't matter. But the two parts would tend to pull apart. Of course that pulling apart is going to put the mechanical linkage under stress, that is the mechanical part that holds it together, in the sense that there is a greaer strain on those connecting parts, and in that sense only is there any intensification of the mechanical grip.

We get the same thing in the Gullborg combination where we pull back against the cross-pin, and that is the only intensification of compressive clutching.

Most of these haven't even any compressive clutching.

There is one other point that I would like to bring out in the Paul or Ulleland patent. Take Paul, which shows the situation pretty clearly. There are some pawls marked 20 adapted to be gripped by the fingers to break the connection. Now, it will be noticed that the
776 417 shoulders 13 against which those pawls abut are substantially perpendicular to the axis, and that there is no need for any compressive clutching in order to hold those gripping members in place, and any slight effect that the disrupting tendency might have to urge those pawls inward is, of course, of no consequence in the operation and is entirely incidental. The same thing applies to Paul, and with the modification of the various parts it applies also to Pinel.

In summary then, those patents, I don't mean to say anything more than that they just don't show the Butler combination.

Q. The defendants offered in evidence a group of patents relating to chucks for holding things to be worked upon in one way or another, namely, Oliver, 926,761, De-

fendants' Exhibit A-65; Lavoie, 1,236,453, Defendants' Exhibit A-63; Lavoie, 1,295,994, Defendants' Exhibit A-64; Delaney, 895,438, Defendant's Exhibit A-66, and Newton, 1,118,876, Defendants' Exhibit A-67. Do any of these patents disclose or suggest the invention disclosed in the Butler patent and described in Claim 2 thereof?

A. No, none of them does. Of the lathe chucks per-
777 haps the Oliver is typical. We see the pulley C in which the belt runs to drive the lathe. The work is to be held at the right hand end, and at the back there is a piston to operate the chuck to grip the work while it is being turned. In this or in any of these lathe chucks there is no desire and no intention to transmit fluid pressure to the piece which is being held.

Perhaps it should be pointed out also that these lathe chucks of this type are intended, of course, for rather
418 large pieces of work. The hand operated chucks are perfectly satisfactory, work very quickly for small pieces of work, and there is no need or desire for this rather elaborate mechanism for anything but large pieces.

That is suggested in one of the Lavoie patents which shows—I guess both of the Lavoie patents show an artillery shell in place, probably a good sized piece, where it would be more difficult to make the chucking by screwing up the various chuck elements. Specifically, of course, there is no means for making a seal against the end of the fitting or nipple. There is not any fitting or nipple. No intention to use any of these for lubrication, and no means, without complete revision, to make them useful for lubrication.

778 In general, I think that characterizes all of the chucks, and specifically the chucks relating to their use in lathe work, Oliver, the two Lavoie patents and the Delaney patent.

The Newton chuck is for a different purpose, for the purpose of testing brake hose, and perhaps the best way to show the mode of operation and in general the construction and operation is to demonstrate with a full sized model of the Newton patent. The Newton patent, on its face, is assigned to the New York Air Brake Company and is described as being a hose and coupling testing appliance. Perhaps I should say at the outset, to avoid any possibility of confusion, that the piece marked 4, which is the member which receives the fluid, is called a

coupling in the Newton patent. We shouldn't therefore, get confused with this receiving member and the transmitting member.

779 419 We see from the patent that there is the characteristic curve on the end of the coupling 4 corresponding with the member which is inserted within the end of air brake hose. The member which is in this air brake hose of Plaintiff's Exhibit 59 is like that which I have in my hand of Plaintiff's Exhibit 60.

Now, we have here a piece of hose to be tested and a coupling member in the hose, and another coupling member attached to the coupling member which is in the hose. Then we have set up here mounted on a board, indicating the use for the stud bolt projecting from the rear shown in the patent, so that the hose can be brought up to this testing device, and the New York Air Brake Company puts the hose in this device to test for leakage of the hose and the couplers. This came from the New York Air Brake Company.

Now we place the valve in upper position. The air is admitted to the forward side of the piston forcing the piston back and retracting the projecting elements back into the outer casing, in that way (indicating). Then the 780 hose coupling is placed within the hose pipe inside, which is made of rubber, rubber and canvas. It is a hose substantially like that of Plaintiff's Exhibit 59. And then the valve is pushed in the other direction to apply air to the back of the piston and to advance the projecting elements into the conically tapered end of the nose piece and to squeeze it around the coupling, the hose pipe, which is inside, and that is accomplished in this way (indicating).

Now, as I have done that I accidentally and unintentionally produced a certain amount of leakage, which is because of the fact, perhaps, that this hose is not as live or new as it might be, and because these coupling 420 pieces are rather irregular in shape. I am going to try, by moving this slightly, to see if I can't get a tight seal. Apparently I am not able to get a seal which is entirely tight. I will try again. There I have a much better seal. Now I am going to try pushing it in not quite so far, and I have a still better seal.

Now the intention is that on turning the valve to the other position, to the up position, this rather heavy piece

of hose and the coupling will be "expelled forcibly," is the way it is described in the patent, from the testing
781 appliance like this. Now, that expulsion is achieved by the compressed air within the hose pipe to be tested rushing back into this hose pipe within the testing appliance, and then the coupling piece forms kind of a piston and is ejected as out of the mouth of a cannon.

I am going to try again to see if I can't get a tight seal, because in that way we get a more marked expulsion. There I have a tight seal, and in that way—

Mr. Koenig: Mr. Williams, what is the difference between the operation a few moments ago when it made that hissing noise, and what it is doing now? It seems to work better now.

The Witness: It works better now. That was entirely because I have not operated this particular device before and I find that it works better when we don't place the coupling member all the way in.

Mr. Koenig: I just wanted to be sure that the record would show that that hissing operation was not the normal one, is that correct?

421 The Witness: That is correct. The proper operation is like this.

Mr. Koenig: Quiet?

The Witness: Quiet now and without leakage around
782 the coupling member. Now the hose has got compressed air in it, and in that way we can test whether or not there are leaks in the hose, whether the hose will stand pressure and whether the brake coupling parts here are making a tight connection.

Mr. Williams: Q. To what pressure should that be tested?

A. Well, to the pressure to be used in the brake lines. I think the peak there is about 160 pounds per square inch.

Q. Of compressed air?

A. Yes, of compressed air. And then by reversing the valve, letting the air quickly, into the back side of the piston, snapping it back, letting the compressed air expand, as compressed air will, back into the cylinder or barrel formed by the hose pipe, we get a very sharp expulsion of the parts being tested.

As I have demonstrated, the end of the coupling fell,

oh, six feet from the testing appliance, which is, oh, perhaps four feet off the floor.

Now, in this, of course, the intention is to take the piece of work to be tested to the chuck, then turn the valve on
783 the chuck, and so to leave the chuck in a fixed or permanent position.

422 Now, I would like to show that it is quite difficult, or nearly impossible, to remove this coupling member from the chuck upon a mere relief of pressure. It is necessary, as a practical matter, to get the air in behind the piston and drive it back. There I have succeeded in making a pretty tight connection. Now, if I simply move the valve up so as to shut off the air, the pressure there assists in the disconnection, and still in this case we can see that I have moved the valve so far as to snap the forward projecting fingers into back position.

Mr. Koenig: Let me understand that now. You then did operate this in the same way that it was operated on the first test. It was supposed to snap it out, as you call it, snap out the nipple from the gripping jaws?

The Court: He took it out manually by simply cutting off the injection into the tube and then took it out manually, whereas in his prior demonstration he not only cut off the compression but reversed the current of air and then forcibly ejected it.

784 Mr. Koenig: Yes. Now then, when you took out the nipple it came out easily under this condition that you have now described?

The Witness: Yes.

Mr. Koenig: And which the Court described?

The Witness: Yes. That is not difficult, where the pressure is maintained in the parts.

Mr. Williams: Q. In what parts?

423 A. In the hose pipe part within the testing appliance.

Q. Do you mean when it is maintained within the hose which is being tested?

A. Yes, and where you get a back pressure because of the compressible fluid in the hose. Of course you won't get that kind of back pressure if you were to use an incompressible fluid, for example, water or grease. A very slight release of pressure will relieve all the pressure that there is, that is a very slight escape of the

fluid. That slight escape is necessary because this theoretical incompressibility is not quite accurate when you have a little bit of air or gas occluded in the grease.

Now, I have one more. Will you shut this air off? Get
785 that piece of rubber hose, will you? Now, I have here another device just like that on the board, with the exception, however, that the hose pipe which came in it, made of rubber, rubber and canvas, has been removed. In its place has been substituted a piece of fiber, tubular. It is located inside these spring fingers that project forwardly. Now, if someone will help me with this thing.

Now, I have connected air to this device having the fiber.

Q. You put a fiber piece in there in lieu of the hose pipe—how is it marked in the patent?

A. 5.

Mr. Koenig: Does that piece of fiber fit that?

The Witness: This piece of fiber was made to fit a coupling member very closely, which, however, was
424 not of the precise size of the coupling member which I have just tested. The reason for that is that these things are of castings. That is all that is necessary, of course, to be inserted and clamped within a soft hose. The hose takes care of the irregularity. Here we can see.

Mr. Williams: Q. Are they of slightly different size, therefor?

786 A. Yes, they are of slightly different size. Now here we can see that the second piece which I have—your Honor will see that that is plugged in the end and that makes rather a snug fit with the piece of fiber. Now, when I turn on the air, of course, the result is as you can see that the spring fingers don't project from the end, as they do in the model which we have just demonstrated, that is fastened to the board, and the reason for that, of course, is that this fiber is stiff and won't allow that compression of the fiber tubular piece.

Now, it is quite impossible to make a piece of fiber, hard fiber, which will work with these couplings in the way and for the purpose in which Newton intended that the device should work, so that—

Q. When you say "these couplings" you mean these air brake hose couplings?

A. Yes.

Q. Let me say, once and for all, I know it is hard, but be careful when you point to things to name them also so that the record will show what you are pointing to or handling.

A. All right, I will try. Now, have we got here that piece of fiber? Here is a piece of fiber of the kind
787 425 used in making the defendants' model. That is not flexible. It seems to me, at least, a stretch to say that it is a hose. I don't know how much I can bend it, but I will try. And of course after I bent it only a matter of, oh, I can't tell, perhaps an inch or two, it broke.

Now, this particular piece of fiber is in the device which is not on the board, in the testing appliance which is not mounted on the board, is not colored red.

788 The Witness: I think I was saying that the fiber in the testing appliance happens not to be red. As far as I have been able to tell, and as far as our machining of it, and so on, is indicated, it is the same in character as the fiber which is colored red, which is in this tube, and which, so far as I am able to tell, is of the type used in the defendants' model. Now, that has worked out in the defendants' model in about the same way that it works here. There is one other thing I would like to say, and it won't take me but a minute. That is to observe the piece of hose pipe which has been removed from the appliance not attached to the board, the testing appliance. Observe that at its one end where it has made contact with the coupling members it has become worn. That is bound to occur. Observe also the tendency of the rubber to flow into the slits to form these spring fingers. Under high pressure this rubber would be blown through
789 these slits. I have made tests which prove it.

426 This wear would soon render a device of this kind —and that holds good whether it is made of a piece of fiber or of rubber—would soon render such a device entirely inoperative when the attempt was made, or if the attempt were made, to use it for the purpose of lubrication.

427 Proceedings of Thursday, April 23, 1936.

790 Q. Mr. Williams, will you resume your answer to the more general question relative to the Newton patent?

A. Yes. Taking up with the wall mounted device of testing appliance, when we insert the hose coupling, which is the receiving member Plaintiff's Exhibit 60, within the testing appliance, and then open the valve to testing position, the hose is squeezed down around the coupling quite tightly; and if I place the coupling member in the proper position I can effect a tight seal at that point.

Now then, this time instead of putting the valve to reverse position so as to retract the piston I will simply
791 disconnect the air line so as to relieve the pressure, and we see here that it is only with considerable difficulty that we are able to remove the coupling from the testing device. Now, in part, that is because all of these things are big, the surfaces are rough, but also it is because of the fact that as we tend to pull outwardly the contact between the hose and the coupling tends to pull the collet assembly forward, pinching it in tighter instead of relaxing the grip.

It is probably to overcome that difficulty that Newton provided this reversing action whereby he turns the
428 valve to the up position as shown on the wall representation here, so as to effect a removal without any effort whatsoever, as demonstrated yesterday. The piece to be tested is blown out, enabling the worker to pick one piece up after another, insert it and test it very quickly.

Now, I should like to refer for a moment again to the Newton patent 1,118,876. In this patent we see a hose coupling which is of a slightly different form from that—And that hose coupling has a series of ribs on it, and
792 those ribs are shown embedded in the hose pipe 5. Now, if one were to attempt to make a hose pipe out of a piece of hard fiber, it would be impossible to secure any of that embedding. The only way we could obtain the configuration shown in the patent would be to put those grooves in the hard fiber material before we ever put the coupling member in it. In others words, on a lathe, or some way, we would have to turn those grooves into the fiber. That would mean that there would be projections between these grooves to go down between the ribs on the coupling member, and of course it would be impossible to insert the coupling member within a material of that kind. Or to remove it if in any way it were once placed within the tube.

Looking at the patent drawing we see that the parts are shown in the assembled position. Now, if the hose pipe or the tube 5 were made of hard fiber so that it was not a hose, then as we can see quite plainly, it would
429 be impossible to withdraw that coupling member.

That means, to me, when taken together with all the
793 rest of the patent, the fact that the device is for testing hose pipe, that he uses hose pipe in speaking of the air brake hose, and then uses the same phrase, "hose pipe", in referring to the tubular member 5, that what Newton contemplated was purely and simply a rubber and canvas hose, or at least some—well, a rubber and canvas hose is what was actually contemplated.

Q. Would rubber hose be satisfactory in a coupler for lubrication purposes?

A. No, it would not be satisfactory. The rubber hose would have to be squeezed between the collet members and the coupling member very, very tightly, and that squeezing of rubber between two metal parts would tend to shred it. If it did not do so on the first operation, it certainly would on the second or third at the pressures which are necessary in lubrication, 1,000 pounds, ten times that which is used in this appliance, or 2,000 pounds, used in greasing. That contraction or compression of the rubber between the hard metal nipple and the hard metal fingers would cause the rubber to flow out from the space where it was contracted. It would be pinched through. Its texture life would be quickly destroyed. Also the rubber, under the pressure from the
794 inside, would tend to be forced outwardly through
430 the spaces between the fingers leaving channels on the under side where the grease would spurt through and make the apparatus unusable for lubrication.

Of course, also, there is the fact that rubber deteriorates very rapidly in contact with oil or grease, and for that reason would not be satisfactory; but no matter what material were used, if it were made yieldable enough to work in the way Newton contemplates having it work and as he shows it working in his patent drawings, any material yieldable enough to work in that way would of necessity be compressed too much between the fingers of the collet and the coupling member or the rib on the coupling member. It would tend to flow out of

that space and and to come through the spaces between the fingers, and in that way would be entirely unastisfactory.

Now, the reason for that is that the Newton device show a peripheral seal, one which seals around the outside of the coupling member, as though I were to grab the coupling member in my fist.

Now, I had here yesterday a piece of red rubber hose that was taken out of this. Here I have a piece of hose
795 which was taken out of one of the Newton devices, the one now fitted with the fiber tube in place of the hose which was removed. Now, that passes over the coupling member, and the fluid, the air, or in the case of a lubricating apparatus, the grease, is tending at all times to expand that tube away from the coupling member or nipple to which the connection is made. The pressure within this tube opens it up, tends to force it not towards a seal but away from a seal.

431 Now, in the Butler patent, and this is rather a fundamental distinction between the two, in the Butler patent the sealing washer or end-seal 51 is pushed by the grease down against the end of the nipple. It is not pushed away from the nipple by the grease pressure, as it is in a device like Newton's, readapted for lubrication. Instead, as the grease pressure builds up that sealing member is always forced harder and harder against or toward the nipple.

Now, that principle upon which the Newton device operates is perfectly satisfactory, apparently, for Newton's purpose, of sealing against air pressure, using a rubber hose to make the seal where those air pressures are of the order of 100, 150 or 160 pounds, but it leads to very serious difficulties, which as a practical matter
796 cannot be overcome when we try to make a lubrication device working on that principle. This is because of the fact that in order to overpower the tendency of this tube or hose pipe to expand, to be forced away from the nipple so that space is left and grease spurts through, in order to overcome that tendency a great deal of power must be developed somewhere to pinch that tube in-
432 wardly toward the nipple, against that pressure of the grease tending to force it the other way.

Now in addition to that amount of power, which is

very, very substantial and quite unlike Butler, in that in Butler there is no power of that kind required whatsoever; all of the power in Butler can go into the gripping of the nipple—In addition, however, to that power necessary to overcome that tendency of the tube to be expanded away from the nipple, there is the fact that any material made rigid enough to be useful at all in lubrication takes a lot of power to be compressed, in and of itself. So that in addition to the power we need for overpowering that opening up tendency, that expanding tendency, we have got to provide enough power to contract some kind of rigid material.

797 Now, let us suppose that we find by experimentation that we need a contraction of, oh 2/1000 of an inch in diameter in order to bring a fiber tube into firm contact, into sealing contact, which is more than just a firm contact—into sealing contact with the end of a nipple. If we need that 2/1000 of an inch we are going to need it whether the nipple is small or whether it is large. The reason I say this is to show that, contrary to what one might suppose at first blush, if you reduce the size of the nipple from that, for example, shown in defendants' alleged model, you might suppose that you could re-
433 duce the power department in size, so as to have something which was not so unwieldy, so that you would have something small enough to get into the cramped quarters where you have to get it, but that is not so, and here is why: This fiber tube, if we are going to expand it or contract it 2/1000 of an inch, means that the circumference somehow must be shrunk by pi times that 2/1000 of an inch, roughly, 6/1000 of an inch. That means in a given length, for example in this tube I have in my hand, the one I broke here yesterday, that for a given amount of material per inch there must be, let us say, 3/1000 of an inch shrinkage; now when we reduce
798 that tube to half its size, we still have to get the same amount of shrinkage, but we haven't got the same amount of material to get it in; so that if the circumference of this tube, for example, is two inches, then in each of those two inches we must get a shrinkage of 3/1000 of an inch. If we reduce the diameter so that the circumference is half that, then we must get all of the 6/1000

shrinkage or contraction in only one inch. And of course that means not less power but more power.

Now, perhaps it would be interesting to point out that in the Newton device—excuse me, in the Newton patent, the ratio of the area of the piston to the area of the nipple which is being sealed against is about 3.2 to 1. On the other hand, so Mr. Wupper tells me, in the model of the defendants the ratio is 5.4 to 1.

434 Q. Suppose you get it and measure it, please. Have we got the device?

799 Mr. Haynes: It is on the test block.

Mr. Williams: May I ask you what diameter you measured there?

A. I measured it as 1.02 inches.

Q. I mean where did you get that? Here?

A. No, that is from the inner bore of the cylinder, of A-68. The diameter of the nipple is 405/1000. I find that Mr. Wupper was mistaken. If my figures are accurate, and I think they are, the ratio is not 5.4 to 1, as Mr. Wupper apparently found, but rather 6.3 to 1. That is double that which is found in the Newton drawings themselves.

Q. Where did you take the diameter of the part to be sealed?

A. I took that diameter at the outer end of the nipple.

Q. If you took it at the collar, why then the ratio would be a little lower than that?

A. That is right. What that means is that proportionately to the size of the nipple the power department has been doubled.

800 Now, that is because of this fundamental difficulty of having to work against the grease pressure as in Newton. Newton, of course, is air pressure, but assum-
435 ing we were using grease and assuming that we could make something that would work with grease there, you have that fundamental difficulty of working against the pressure on the inside tending to separate the seal away from the nipple, and because when you get a material stiff enough to stand up and do any work and do any sealing without being blown to pieces or cut to pieces, then you need a lot of power to contract that inwardly, and altogether the result is that you have at the back end here a very, very large, cumbersome piston and cylinder

assembly; and, as I pointed out, contrary to what one might suppose, that cannot be materially reduced in size from the defendants' alleged model even by reducing the size of the nipple down to a size very much smaller.

Q. Unless you have something else in mind you want to take up next, I would like you to some time demonstrate the attempt to use fiber in the Newton testing device rather than the rubber hose.

801 Q. Now, I wish you would take up the defendants' presentation of Newton in Defendants' Exhibit A-68, and compare that with the Newton apparatus as disclosed in the Newton patent. Perhaps the quickest and best way to do this is to take the model part by part and show the very complete and extensive re-organization of the model as compared with the patent itself. Looking first at the piston—

Mr. Williams: Q. I wonder now, if you are through with the operation of these big things, if perhaps you better resume the witness chair and lay a blotter out there to work on.

436 A. Now, when we look at this piston we see that there is a cup leather in here. We see that there is a cup leather in here turned towards the back so as to seal against the grease pressure. There is nothing like that 802 in Newton. He has simply the conventional air or steam piston. In addition to that, this piston has been made so that it is a one-way operating piston. If there were any attempt made to put grease into the back side of that piston to move it back and relax the grip, with the contraction of the hose the grease would simply flow by that cup leather, because of course the cup leather seals in one direction only.

The cylinder itself, as I pointed out, has been changed in the ratio its size bears to the nipple. The cylinder has been changed also in that in the Newton patent we have here a packing gland and an opening to get in there to tighten that up to make a tight fit, an air-tight fit, against the piston rod. In the defendants' representation, of course, there is no tight fit, no packing gland, or anything of the kind. Also the port 20 shown in the patent has been omitted.

Now, in addition to that the valve assembly has been entirely reconstructed. The valve member within the

valve chamber is entirely different. The ports are arranged entirely different, and in general the valve bears this similarity only to the valve of Newton, that it is in a way a valve.

803 437 Mr. Williams: Have you got a wrench that you could loan us, the one that fits that Newton device, that socket wrench? Have you got a special screw driver to take that apart?

The Witness: Now I am removing the nut in the model at the back of the piston. Of course, there is no nut of that kind shown in Newton, none necessary. And then we find in looking at this piston rod that here at the place where the grease enters instead of having a passage, a substantial opening like that in the device, I mean in the drawing of the patent, or even like that of the drawing made by the defendants of the model, we have a little, tiny pin hole. That, apparently, is made by setting a plug into the end with a small hole in it. That, I presume, was found necessary in order to develop a pressure back of the piston before the grease all ran through it, which indicates that the power that is needed out at this seal end is important and large in amount as compared with what is needed in Butler, with the result, of course, that Butler can be made smaller. That, however, seems to me not a very serious departure from the patent itself which does show some restriction at that point.

804 Have you got a pair of pliers?

The collet or spring finger assembly has been quite thoroughly redesigned and restyled as compared with the patent, which shows long fingers coming back. We notice here that those fingers are not sectioned, showing that the cuts do come back all the way to the base plate.

438 What happens if you apply grease to a device of this kind with these long fingers is that this pressure inside pressing that hose outwardly will expand and bow out those fingers. I have made tests which show that that is so. For that reason, probably, it was found necessary to redesign this spring finger assembly quite materially. And then within the collet we find this piece of hard fiber, and that is connected to the stem of the device by a screw, a very special kind of a screw with a hole through it, and this fiber element has at the back an in-

turned shoulder or skirt against which the screw, the retaining screw, abuts so as to make a grease-tight seal.

The construction shown in Newton in the patent would be very liable and in all probability would develop excessive leakage back around the back end of the hose. That
805 is because of the tendency of grease first to seep its way through spaces very minute, and then as it seeps in there to develop pressure causing the gradual, at first, and then very sudden opening up of the joint with the consequent spurt and leakage of grease.

Now that means, just looking at these elements, the alleged hose pipe, the alleged retaining ring turned into a hollow screw, the spring finger assembly, the piston, the valve, the outside shape, the fact that the valve is separate from the assembly, everything in and about this model, with the single exception of the barrel, the forwardly projecting barrel given the numeral 11—no, 12, in the
439 patent—everything except that has had to be modified. And still that device is not satisfactory for lubrication. It is much too bulky and clumsy to get into the tight quarters where you have to get, and the simple procedure of reducing the size of the fitting would not correspondingly reduce the size of the apparatus to be attached to it.

There are these two facts then, that after all of this reorganization there is still leakage, and it is still far too clumsy to be of any practical use whatsoever for lubrication.

806 Now in addition to that leakage, the clumsiness—perhaps I should not say in addition to it—those are caused by the fundamental distinction which I think I have already outlined to your Honor, that the seal is not squeezed in by the grease but is squeezed away from the nipple. It just places an insurmountable obstacle in the way of making a satisfactory lubrication device. In addition to that, this kind of a peripheral seal is very much subject to wear. As that slides over a nipple with a little grit on it that sliding contact very rapidly will cause that peripheral seal to wear out. There is not the sliding contact in the case of an end-seal like that of Butler, because there is a straight abutment, and even if it did wear somewhat, it does not make any difference because the grease pressure will simply move it down that much further.

Then there is another fact which makes this entirely unusable, and that is that it has no degree of adaptability to fittings of different sizes. This device apparently has been made so that it will cooperate after a fashion,
807 440 but with some leakage, with a nipple having a ring on it or band with a diameter, as you measured it, of 443/1000 of an inch. Now that is fine for making a demonstration, but if that diameter of that band is increased only 5/1000 of an inch, half of 1/100 of an inch, then the device becomes entirely unusable. Similarly, if the diameter is reduced from 443/1000 of an inch to 441/1000 of an inch, then this hard fiber piece cannot be contracted sufficiently to make a seal. We get no pressure into the bearing whatsoever, and we get all of the grease which we pump leaked out around the point of connection.

808 The Witness: I have now Defendants' Exhibit A-68, and I have inserted in the test block a nipple similar to the nipple of Defendant's Exhibit A-68, with the exception, however, that the rib on the fittings is slightly larger in diameter, by 5/1000 of an inch. When I place the coupler over the fitting and attempt to develop pressure, I find that I am able to develop a pressure of 1,500 pounds without any substantial amount of leakage. There is a slight amount on one side, but not of any— Now, upon relieving the pressure in the gauge and backing off the compressor, as Mr. Fox did, I find it—

809 Mr. Koenig: Are you pushing that down now?

The Witness: I am trying first to push it down and then pull it up. I have now pushed it down, forcing the grease back into the compressor.

Mr. Williams: Q. That pushing down corresponded, did it, with Mr. Fox's operation?

441 A. Yes, precisely. And it is now down as far as I can push it, and I am sure that the piston and spring finger assembly and all has moved to the limit that it can move. With all my force, and I exerted it sincerely, I am unable to remove the testing appliance from the nipple.

Mr. Koenig: This is not the nipple Mr. Fox used?

The Witness: Oh, no. This is one larger. Now, by unscrewing the barrel—

810 Mr. Koenig: Are you doing that with a wrench?

The Witness: Yes, then with my fingers after it is

started. I am then able to remove the testing appliance. And that means that if a nipple of that kind, supposing that this kind of a system were in use, this kind of an appliance were in use for lubrication—then when due to defect in manufacture, or merely commercial tolerances, the fitting was slightly oversize and as the tools got worn and didn't go in quite so far, then you would have the kind of a situation I had here, in lubricating a car.

(Plaintiff offers in evidence as PLAINTIFF'S EXHIBIT 71 the fitting just used with the Defendant's Exhibit A-68 apparatus, in which the collar or rib around the fitting is 5/1000 of an inch oversize.)

442 The Witness: Now I have a nipple made like the defendants' model nipple of Exhibit A-68, which, however, has a rib 2/1000 undersize, 2/1000 of an inch. And when I place the testing appliance on that kind of a nipple we find that we get substantial leakage and substantially no pressure. Does your Honor see the grease pouring out? Here is a pressure of, oh, 100 pounds perhaps. By a sudden jerk I have gotten the pressure up here to, oh, 1,100 pounds, and the leakage continues oozing out.

Mr. Koenig: Can't you run that pressure up some more?

The Witness: Do you want me to run it to a higher pressure than that?

Mr. Koenig: 1,500?

The Witness: All right, I will try it. There is 1,500 pounds, the leakage continuing to come out. The coupling is tight. It is continuing to leak; it is pouring over the edge. Here, you can see that the pressure is dropping as it leaks. There is no question about it, that it leaks, and that amount of leakage, of course, is entirely unsatisfactory for lubrication. And now again I push the testing appliance toward the fitting, and in this case I am able to remove it quite easily because the shoulder is smaller.

443 Now, in the Butler patent we see this end-seal 51, and if the diameter is changed, that is the diameter of the fitting is changed slightly by the different size shoulder, 7/1000 of an inch, between two limits, so that in one case the piston will go, that is the piston 45 will go forward partway, and in another case it will go far-

ther still, the sealing member 51 will adapt itself by sliding to the proper position to make a seal.

(Plaintiff offers in evidence as PLAINTIFF'S EXHIBIT 72, the second of the nipples with the collar or rib 2/1000 of an inch less in diameter than that of the defendants' sample, forming a part of Defendants' Exhibit 68.)

Q. Have you demonstrated the adaptability of the Butler construction and the Alemite hydraulic construction to such variations in size of the nipples as you have been talking about?

A. Yes.

Q. And do they interpose difficulties in the way of operation, or does the device operate satisfactorily with nipples varying in size?

813 A. Yes, it does. Now, as I understood Mr. Fox, he testified that there was not the adaptability of the Alemite hydraulic with respect to the Lincoln Kleenseal fittings, which is brought about by the slight independence of movement between the end-seal element and the piston.

Now, perhaps before I do this I had better show what I have here. I have two Lincoln Kleenseal type fittings, in which, however, in one the groove is 8/1000 inch
444 up toward the head of the fitting from the location given it by Lincoln, and the other is 8/1000 down, meaning that there is a tolerance there in manufacturing of 8/1000 inch either way, or about 1/64 of an inch.

814 Mr. Koenig: Where the groove is lowered 8/1000, is there a cylindric portion between the great circle of the sphere on the end and the groove?

The Witness: I think so, yes.

Mr. Koenig: And where it is raised, do you cut away part of the sphere, or have you lengthened the fitting?

The Witness: No, I don't think that cuts into the sphere. I think it comes quite close to the intersection of the diameter.

Mr. Koenig: You think there is a hemisphere left?

The Witness: Oh, yes. Now I apply the nozzle of Plaintiff's Exhibit 62-B, which is connected to the electric compressor of Plaintiff's Exhibit 20 and to the fitting in
815 which the groove is moved toward the head, and I secure a perfectly satisfactory operation. That thing is not in

tight. There is a pressure of 4,500 pounds without leakage.

Mr. Williams: Q. You are using an Alemite hydraulic coupler and compressor, are you?

816 A. Yes. Someone just tells me that the reference I made to 62-B is incorrect because the tag was not appropriately placed. I am using the control valve and nozzle connected to Exhibit 20 the same way as I used it yesterday. Now, here is a fitting with the groove moved
445 down toward the base 1/64th of an inch from the fitting—from the groove in the fitting which I just used, and that again works perfectly satisfactorily without any leakage.

Q. Did you develop a pressure there?

A. Oh yes. That developed a pressure of 3200 pounds.

(Plaintiff offers in evidence as PLAINTIFF'S EXHIBIT 73 the first of these last two fittings, the one with the groove moved toward the head 8 thousandths of an inch, and the second one with the groove moved away from the head as PLAINTIFF'S EXHIBIT 74.)

817 The Witness: Now, what that means is that as compared with the Newton, we have got a degree of adaptability sufficient to take care of the commercial variations and to take care also of the nicks of abrasions. The wear on the head of the fitting, of course produces the same effect as moving the groove nearer to the head, and that wear sometimes occurs on cars where they are driven on gravel or sand roads and are bombarded with particles of gravel. Some of our couplers have a slightly greater range of adaptability than this one, but I think that all of them, with the possible exception of a few of the very cheap type, will have that degree of adaptability, and even the very cheapest ones for the most part will have that degree of adaptability. I say that because all of them were made in accordance with prints which do give that adaptability. At one time for a period of a couple of months they made some which did not have the adaptability because of the fact that they could not get rubber washers of a small enough thickness to allow the proper movement of the sealing element with respect to
446 the piston.

I think we ought to put in this gauge with those two fittings.

Q. Did you say something about this gauge?

818 A. I guess not. I have here a gauge which has a notch in it adapted to—perhaps I should say a templet which has a notch in it adapted to register with the position of the groove when the groove is moved toward the head of the fitting. I am referring to the last two fittings which I just used, and when this is applied to the fitting in which the groove is moved away from the head, then, we see quite clearly the difference in location of the grooves.

(Plaintiff offers in evidence PLAINTIFF'S EXHIBIT 75, and ask that it be marked as said template.)

Q. Now, during the course of his testimony Mr. Fox undertook to compare claim 2 of the Butler patent with the disclosure of the Newton patent. I wish you would turn to that claim 2 of Butler and say whether or not the combination of that claim is to be found in the Newton disclosure, and why, as to each element as you take it up.

A. Now, reading claim 2:

"The combination with a headed nipple for receiving lubricant, of a lubricant compressor."

Well, of course, first, there is nothing about Newton 447 to indicate its intention, or the intention, that it
819 should be used for lubricating purposes.

Passing that, however,—

"having a coupling member for connecting said compressor and nipple."

If we get over the hurdle of the matter of lubrication, we may say that there is a coupling member, and that is the fixed testing appliance, and the nipple would be what Newton calls the hose coupling.

"comprising a cylinder"—Newton has a piston—

"a piston movable within the cylinder, and having an aperture for the discharge of lubricant thereof."

Newton's drawing shows an aperture for the discharge of air, which is a fluid in a sense.

"an apertured sealing seat carried by said piston for engagement with the end of the nipple,"—

Now, Newton does not have that. What Newton has is this piece of hose pipe, which engages not the end of the nipple but rather the side or the periphery. Butler, however, shows this end seal 51, which moves down and seals
820 against the end of the nipple. So that Newton lacks that, and that goes to that point that I have made that this kind of a thing, suitable as it is for Newton's purpose and,

perhaps, the most desirable for his purpose, is unsuitable and undesirable for lubrication.

448 "connecting the piston aperture with a passage through the nipple".

What I have just said, of course, refers also to that.

"radially movable locking elements carried by the cylinder coacting with the nipple and actuated by said piston for compressively clutching the elements upon the nipple."

Now, Newton does not have that and that's because these fingers which Newton shows are not intended for clutching the nipple. What they are intended for is for compressing this piece of hose around and that in a sense, of course, through the intervention of the hose does effect a sort of clutching, but that is scarcely what Butler referred to when he spoke of radially movable locking elements. That is so because of the fact that the power which is developed by this piston has to be used to overcome that opening up tendency of the grease and also to overcome the stiffness of whatever rigid material might be inserted instead of the hose pipe, so that if that power
821 is used for that sealing it does not go into the clutching. If it did go into the clutching, that is, supposing the tip ends 10 of these fingers were made so they did make a contact with the side of the nipple, compressively clutching then, of course, they would not be compressing the hose. Certainly they would not be compressing any fibre material sufficient to make a seal against high pressure.

449 Of course the remainder of the claim,

"whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said elements while the lubricant is passing through said connecting parts".

Except for the matter of lubricant, that is true of Newton with this limitation, that the compression of these locking elements is not for the purpose of a clutching, an inward grip of those fingers or elements against the nipple, but rather for the purpose of contacting the hose pipe seal.

Q. I wish now that you would turn to four patents relating to the art of lubrication which were offered in evidence by the defendants, namely, the patents to Wurster No. 356,519, Defendants' Exhibit A-72; Dupre, 927,-

337, Defendants' Exhibit A-50; Seng, 1,322,357, Defendants' Exhibit A-48; and Richardson, 8251, Defendants' Exhibit A-45. Do any of these disclose or suggest the
822 invention of the Butler patent as illustrated in the drawings described in the specifications and set forth in claim 21?

A. No, none of them do. Here, just briefly, Wurster shows a device having a hand pump on it and a wheel here to screw up and make nothing more or less than a screw in connection almost to a pipe thread connection, with a passage for lubricant. There is nothing automatic about it. It is just as straight a forward pipe connection as one can make.

450 The Dupre patent 927,337 shows a somewhat similar arrangement, except, however, that in Dupre there is a claw which passes over the—under the head, a lubricant, a receiving member, and then again you screw up to make the connection,—a clumsy if necessary thing to do this screwing up. No piston, no cylinder, as in Butler, no radially movable locking elements.

Seng, 1,322,357. This shows a nipple having a piece *n* threaded into the end so as to leave an overhanging skirt, and then there is a coupling member which has some balls in it, and the idea is that you place that coupling over the nipple and then push the sleeve *b*, I think it is forward, and push the balls into place behind this
823 projection at M. To remove the coupler, you first pull that sleeve back and let the balls move outwardly, and then remove the coupler. Of course there there is no piston, no cylinder, as Butler has them, no radially movable locking elements actuated by any piston. It does not have the operation of Butler and does not accomplish Butler's purpose.

Richardson 8251 just shows a little nipple of a size pretty large, into which the tip of an oil can can be inserted to press the closure or valve down. Richardson says in his patent that he wants that spring to be very weak. He says:

"—the spring requiring to be only strong enough to hold the valve in place".

and he refers to the pressing of the spout to the
451 feeder. And then a little later on in line 66 and following he says:

"This oil cup possesses one great advantage over the

oil cup in common use, as many bearings are placed in such positions that when the machinery of which they form part is in motion, it is difficult to remove their stopples"—

and then he says

"while this may be opened by a long-spouted feeder, where the hand could not reach."

Now, Mr. Fox developed a theory that the feeder was
824 intended to go in and make some kind of a sealed contact. You could not do that with a long-spouted feeder, which is what Richardson referred to, and even if you could, of course, there is nothing about this that suggested any use whatsoever. The ornamental groove, that rib, is incidental and of no consequence to Richardson's purpose. He makes no mention of it.

Q. Mr. Fox said that he found in Richardson the disclosure, or at least the implication of some pressure conveying connection between the feeder and spout and the nipple shown. Do you agree that Richardson disclosed or contemplated such a pressure connection?

A. No. Everything in and about the patent negatives such a conclusion.

Q. Mr. Fox while testifying as a witness for the defendants was asked whether he could name any one patent or other publication or any patent application filed prior to the filing of the application for the Butler
452 patent in suit on February 19, 1923 which in and of itself disclosed lubricating equipment comprising in any form whatsoever, nipples permanently attached to the bearings and a compressor having a coupler adapted for attachment to any one of the nipples in which the
825 coupler has any kind of means whatsoever for compressively clutching or mechanically gripping the coupler to the nipple, and any kind of means whatsoever for sealing the joint between the coupler and the end of the nipple against leakage, both of which means are automatically operated by the pressure of the lubricant in such a way that the intensity of the mechanical gripping and the tightness of the end seal are increased as the pressure of the lubricant is increased. Is this description fulfilled by the disclosure of the Butler patent in suit?

A. Yes, it is.

Q. Do you know anything in the art prior to Butler which fulfills it?

A. No, I think there is nothing.

Q. Mr. Fox was asked whether he could name any one patent, or any publication or any patent application filed prior to the filing of the application for the Butler patent in suit on February 19, 1923 which disclosed any kind of pumping system for any kind of fluid whatsoever, either liquid or gas, in which there is a compressor connected to a nipple by a coupler, which includes a cylinder and piston cooperating so as to tighten any kind of gripping elements inwardly around the nipple upon
826 453 actuation of the compressor, and which also includes a fluid-pressed seal engaging the end of the nipple to effect a fluid-tight joint. Does the disclosure of the Butler patent fulfill this description?

A. Yes, it does. I think there is nothing in the art prior to Butler which fulfills this description.

Q. Mr. Fox advanced the Winkley reissue patent No. 14,667 as complying with the description contained in both of the foregoing somewhat formal statements. Will you state your opinion as to whether the disclosure of the Winkley patent complies with either of those descriptions, and give the reasons for your answer.

A. No. The disclosure of the Winkley patent does not comply with these descriptions. The Winkley patent shows a claw-like piece adapted to go over the head of a so-called button head fitting. Now, all that claw does as it passes over the head of the fitting is to force down a kind of modified end of a tube for making a spring-pressed seal against the end of a fitting. The tube is numbered 38 and is shown connected to a barrel-like construction consisting of the parts 37, 43, 42 and so forth.
827 Now, within that barrel-like construction there is an element 42 which served simply to open a valve when the coupler is attached to the nipple, and that's its only function. Now, the only thing that holds this sealing element against the end of the nipple is a spring in behind it. Now, it might look from this drawing as though
454 there was some intention that that little casing there was supposed to operate in a tight fitting cylinder so that it comprised a piston and so that grease would push it down toward the fitting, but there is nothing like that. We see that part of the drawing is sectioned at the lower part—I am looking at figure 3—and in the upper part it is not sectioned. In that respect it corresponds,

and in other respects it corresponds, in all other respects it corresponds with a brass model which I have here. Let's see, I said in all respects it corresponds. There is one deviation. The cap corresponding with the piece 48 has in it a set screw, which can be used to tighten down directly against the sealing element to augment the pressure of the spring where high pressures are to be developed. Now, of course all that means is that there is no means for having the fluid pressure tighten the grip, or even having anything to do with making the grip. The
828 only possible thing the fluid could have to do with a grip is to force this little barrel-like element up away from the fitting.

Q. Would that break the seal?

A. Yes, that would break the seal, of course, and the grease would pour out all over. So, of course, there are no radially movable locking elements. There are no locking elements at all in the sense that there are in Butler, or in these statements, because this claw is a solid
455 brass piece which is not movable, and the pressure on this does not even increase as the grease pressure increases. The spring is the only thing which tends to separate the parts up to the point where the grease begins to leak. So that there is no intensification of any grip, there is no intensification of any seal.

Q. In looking over the record there is one point that seemed to me was not left very clear. I think it was yesterday you were discussing the formation of the Lincoln Company's Kleenseal fitting, and particularly the angle of 30 degree from the perpendicular with which the one side of the groove is formed, and the angle of 5 degrees at the other side. I wish you would answer again, or more fully, as to whether or not that 30 degree angle is essential or important or necessary for the accommodation of the nose of a nozzle having the inturned skirt at the outer extremity.

A. No, that particular shape is not at all necessary. The upper edge of the groove could be made at a right angle instead of at a 30 degree angle and it would work properly. Perhaps, I can illustrate that by making a rough sketch showing what I have in mind. (Makes sketch.)

Now, I have drawn here at the left hand side of this sheet a Lincoln type fitting, having the right angle

shoulder at the upper side of the groove instead of the 30 degree angle which is found in the actual Kleenseal fittings.

456 Now, looking first at the actual Kleenseal fitting, we have a nozzle nose piece shaped something like what I have drawn here, and their—as I examine it their construction has a slight slope on the under side, that is, the inside of the flange of the nose piece. That may correspond roughly with that 30 degree slope on the fitting. It would be perfectly possible, however, to cut it up so that the line was straight, so the cut was straight, by taking away material and then, of course, there would be
830 no interference. Or, similarly, it would be very simple to make the nose piece of a configuration like that shown on the left hand side of the sheet where the slope part is made on the outside of the nose piece and the square part on the inside. That might even have some advantage if this matter of guiding is of real consequence because the shape of the nose piece would then present a conical flare, which would be of assistance in guiding at distances and toward inaccessible places. As a result, the point of all this is simply that that 30 degree angle is not a matter of necessity for practical cooperation with the N-6 type of nose piece.

(Plaintiff offers as PLAINTIFF'S EXHIBIT 76 the sketch in evidence.)

(Plaintiff offers in evidence as PLAINTIFF'S EXHIBIT 62C the steel nipple that the witness used in discussing Plaintiff's Exhibits 62, 62-A and 62-B).

(Plaintiff offers in evidence as PLAINTIFF'S EXHIBIT 77 the brass fragment or model used by the witness in discussing the Kinkley patent).

831 457 (Plaintiff offers in evidence as PLAINTIFF'S EXHIBIT 78 the large Newton device mounted on the wall board).

(Plaintiff offers in evidence as PLAINTIFF'S EXHIBIT 79 the sample of the Newton device which is not mounted and in which there was placed a fiber packing tube).

(Plaintiff offers in evidence as PLAINTIFF'S EXHIBIT 80 the plugged coupler which was used with the demonstration of the Newton apparatus).

(Plaintiff offers in evidence as PLAINTIFF'S EXHIBIT 81-A and 81-B the two parts of the piece of red

fiber tubing about two feet long and an inch in outside diameter which was used by Mr. Williams and broken intentionally as he described and offers the section of fiber pipe of tubing of about 1¾ diameter, used by the witness, as PLAINTIFF'S EXHIBIT 82).

(Plaintiff offers in evidence as PLAINTIFF'S EXHIBIT 83 the piece of rubber hose removed, from the sample of the Newton device).

(Plaintiff offers in evidence all those things that were marked for identification one by one).

(Noon Recess).

458 Stipulation.

834 It is stipulated that if Frank S. Barks, president of the Lincoln Engineering Company, were called as plaintiff's witness, he would testify under oath that on or about February 21, 1933, he wrote and signed this Plaintiff's Exhibit 53 letter to J. E. Otis, Jr., vice-president of the Alemite Corporation and that it was sent to Mr. Otis on or about that date.

835 *Cross-Examination by Mr. Koenig.*

The drawing entitled "Drawing of Plaintiff's Exhibits 62 and 62A is marked for identification as Defendants' Exhibit A-80.

I recognize that as being a drawing of Plaintiff's Exhibits 62 and 62-A, in a general way, I have not yet had an opportunity to compare all of the measurements, but I will say that in general I think it is accurate. I notice
836 some discrepancies which are, perhaps, of minor character. The Butler replica did not have in it a washer of the type shown in this drawing. Instead it had a cup leather. That cup leather was taken—well, not that cup leather. The cup leather was made to duplicate a cup leather which was found in the original. Also I notice that the jaws here are shown at a very considerable angle on the bottom. My belief is that that angle is exaggerated. There is, of course, some angularity there, but to represent that there is some angle there I think that in that respect the drawing does represent the actual device. I have not measured all of the dimensions on the drawing

nor have I compared them with the measurements of the actual device which apparently it is intended to represent. In general, however, it does represent that device. Here I have removed from the replica one of the jaws and it looks to me as though the angle on the bottom of that jaw has been exaggerated considerably in the drawing. That replica is Plaintiff's Exhibit 62.

459

837 The drawing entitled, "Drawing of Plaintiff's Exhibits 63 and 63-A" is marked for identification as Defendants' Exhibit A-81.

I would say that that drawing represents Plaintiff's Exhibit 63, in a general way.

Q. Would you make the same remark in respect to the packing member on that drawing as you have in reference to Defendants' Exhibit A-80?

A. It is shown solid. The one which we made had a shape with a slight curvature on the side toward the fitting, and with up-turned edges at the upper side. This is shown simply as being straight. I notice here that there seems to be quite a discrepancy shown between the angle of the projecting fingers, that is the conical flare at the inner end, and the jaws themselves. I have noticed, now that this drawing comes to my attention, that there seems

838 to be also in the model some slight discrepancy between those angles, and I don't know whether or not the amount of discrepancy has been accurately measured and shown in this drawing, but that there is some variation in those angles is, of course, the fact.

Q. Plaintiff's Exhibit 63, would you look at the piston in it, and indicate the relative sizes of the holes in the piston part, the hole in the piston part, and that in the packing member?

A. The hole through the upper cup leather, which corresponds with the part 45 in the patent drawing, is larger in diameter than the hole through the end-seal member 51. I don't recall that that relationship is inverted in the Butler patent. It seems to be.

839 460 *Redirect Examination by Mr. Williams.*

Q. Have you any comment to make about these measurements that you have been asked about?

A. Yes, I have this comment to make, first, that the smaller hole which was used in the sealing member 51

was used in order to cause the packing member to have a little pressure developed behind it to move it up into contact against the end of the fitting. I noticed that the same procedure was followed in the case of the defendants' model A-61. In the replica, which was all a little bit smaller, that did not seem to be necessary. That is a perfectly natural and common expedient to take to secure the mode of operation described in the patent. Also I should like to point out that whatever discrepancy there may be between the angle on the front end of the spring
840 fingers of the piston assembly of the Plaintiff's Exhibit 63 does not, in my opinion, affect the proper functioning or does not change the functioning of the device from what it would be if the slope on the projecting spring fingers accorded quite precisely with the slope on the segments 40. That is because, as we see from an examination of the drawing of Plaintiff's Exhibits 63 and 63-A.

Q. That is Defendants' Exhibit A-81.

A. Oh, yes. —the slope which controls the force which is exerted inwardly is the slope on the jaw or segment 40. If that slope is made a very steep slope, that is to say almost parallel with the fitting, then a great amount of force will be transmitted to pinch the segments inwardly.

If the slope, on the other hard, is very flat, say nearly
461 parallel with the base or cap end of the coupler part, then proportionately less force will be exerted inwardly against the nipple. So that what that means is that that particular slope on the segment controls the inward force. Equally, it should control the force outwardly, because while at first it might appear that these segments would tend to cock as the nipple or fitting was
841 withdrawn, we can see that as we tend to withdraw the nipple there is a camming action which takes place between the bottom side of the head of the fitting and the upper corner or upper edge of the jaw or the jaws, and we can see that that is at a point higher than the place where the piston or projecting spring fingers makes contact with the segments, with the result that the tendency would be, if anything, to cock the segments in the direction to produce still greater angularity. Not much. There is not much to begin with. But a somewhat greater angularity between the conical bore of the piston and the slope on the segments.

And I should like to say this also, that while this dis-

crepancy is called to my attention now for the first time, I have tested and operated samples in which I am certain that such a discrepancy did not exist, and such samples operated entirely satisfactorily.

Q. In the same way or in a different way?

A. No, in the same way that I have demonstrated here and in the same way that this sample Plaintiff's Exhibits 63 and 63-A operates.

842 462 *Recross Examination by Mr. Koenig.*

Q. Referring to that drawing Defendants' Exhibit A-81, if the angle that is subtended by the conical exterior of the locking jaws is made greater with respect to the axis of the coupler and fitting, then the locking action is less under the head?

A. Well, perhaps the clear way to state that is that as the slope, as we see it on the drawing, becomes more nearly parallel with a line taken transversely of the fitting, then the pressure which is exerted to clamp the jaws inwardly is lessened. That is correct. The more that line becomes parallel to the axis of the fitting the greater the force there is.

Q. Now, conversely, when you draw the coupler from the head of the fitting if the angle is small with respect to
843 the center line of the fitting and the coupler, then it would be more difficult for the jaws to ride out over the head and, as you say, cam out the piston, isn't that true?

A. I don't think that is the controlling—yes, I—

Q. You say there is no difference then?

A. No, I think that if I understand you correctly you mean that as this slope at the outside of the jaws, becomes more and more nearly parallel to the axis of the fitting, then the component of force which is exerted to force the piston upwardly, as shown in the drawing, upon a given amount of exertion of straight withdrawal, that component becomes less.

Mr. Williams: The plaintiff rests.

844 463 Defendant's Surrebuttal Evidence.

VICTOR G. KLEIN, Witness for Defendants:

Direct Examination by Mr. Haynes.

My full name is Victor G. Klein. I am twenty-six years old. I live at 5736 Kennerly Avenue, St. Louis, Missouri.
845 I do research work for the Lincoln Engineering Company of St. Louis. My duties include the reading and checking of mechanical drawings as compared with the structures shown in them. I have been with the Lincoln Engineering Company at St. Louis about a year and a half.

I recognize the drawing which has been marked for identification as Defendants' Exhibit A-80. It is a drawing of Plaintiff's Exhibits 62 and 62-A in this suit. I took part in making that drawing. I personally checked and rechecked dimensions and contours and angles shown on
846 that drawing, as against the exhibits themselves. I did that last night and this morning; partly at the office of plaintiff's attorneys.

Q. Some question has been raised as to the manner in which you have depicted a gasket shown in the center of the illustration. Was that something that you could get at or not?

A. No, it could not be removed without damage, so it was not taken out.

I personally examined every other part of that apparatus when I made the drawing. I took particular care to show the angles correctly.

I have here another drawing which was marked for identification as Defendants' Exhibit A-81. I took part in making this, at about the same time as Exhibit A-80. I made this drawing A-81 from Plaintiff's Exhibits 63
847 and 63-A . I did some of the work at the office of plaintiff's attorneys.

464 My comment which I made as to Exhibit A-80 applies also to the gasket shown in the central part of this Defendants' Exhibit A-81 drawing. Except for that gasket I personally checked and rechecked each part of that exhibit.

This drawing A-81 accurately represents Exhibits 63 and 63-A. I took particular care to measure the angles correctly.

(Defendants offer in evidence the drawings as DEFENDANTS' EXHIBITS A-80 and A-81, respectively).

848 *Cross-Examination by Mr. Williams.*

Q. Let me look at these angles that you have been talking about. I am not sure that I know what angles are being talked about, but if your answer referred to the angle of the conical bevel on the interior of the inner cylinder 42, is it that angle and the angle of the jaw with which it makes contact that you refer to as having been measured accurately?

A. I referred to all of the angles.

Q. Well, are there any others that you think of as being angles of the fitting?

A. Well, the angles on the fitting, the angles on the jaws. And the angles on the piston, on the cup, the spring fingers.

I measured those angles so that I can say my drawing
849 is accurate, with a micrometer and bevel protractor. I have the bevel protractor here. The micrometer is to measure the outside dimensions only, the length and the thicknesses.

465 Q. I am interested to know how with this protractor you could accurately measure the angle on the interior of this cylinder 42. Show me how you do that.

A. It just so happens that the angle in this piston, the spring finger members, is an included angle of 90 degrees. That is the drawing of this one. That is not
850 true of the other one also. This included angle is something other than 90 degrees on A-81.

Q. How could you measure that?

A. Here is a templet that was made to conform with the angle of the spring fingers.

Q. What did you do? Take this piece of a tobacco can and cut it with shears and stick the templet in until the light indicated that you had the angle?

A. First measured it as close as it was possible to with a bevel protractor and made the templet according to that, and then if there were any discrepancy in the fit that was taken care of to make it fit absolutely. I cut and tried the tin until it fit.

Mr. Haynes: The defendants rest.

851 466 *Plaintiff's Surrebuttal Evidence.*

LYNN A. WILLIAMS, JR., Witness for Plaintiff:

Direct Examination by Mr. Williams.

Q. Relative to this matter of the angle between the conical surface at the forward end of the inner cylinder 42 of Butler, with respect to, we will say, the axis of the
852 cylinder and as compared with the angle of the camming surface of the segmental jaws 40, have you heretofore made any demonstration in court during this trial of Butler device in which those angles are exactly or substantially identical?

853 A. I have made a demonstration here in court in
854 which the coupler was one where the fingers terminated in an angle or in a conical bore which accorded, I think, identically with the angle of the segments themselves. That demonstration was made with the defendants' model 61 Butler sample. And when the brass ring was in place to hold those spring fingers rigidly, and then when the bore was lengthened out, that is the bore of the cylinder by adding on the cap so as to allow a little movement of the piston, then I demonstrated a perfectly satisfactory operation.

856 This further sample is marked for identification as Plaintiff's Exhibit 84.

Mr. Koenig: Is the model that you now have and intend to demonstrate, another model corresponding to or
857 like Plaintiff's Exhibit 63, but merely corrected as to the angle of the jaws?

The Witness: Yes, I think that is correct.

Mr. Koenig: The exterior angle of the jaws.

The Witness: I think that is correct. Well, I don't
467 know whether it is the jaws or the—the two correspond, that is the angle on the spring fingers and the angle on the jaws, and that angle, that included angle, is less than 90 degrees. And I have operated this model and it operated satisfactorily.

Mr. Williams: Q. Won't you just demonstrate that operation?

A. Yes. I have a fitting in a test block, and I place the coupler over the fitting, make the grip, and develop a pressure of 1,500 pounds.

Mr. Koenig: Before you relieve the pressure will you take this gauge and measure the distance between the bottom of the coupler and the top of the flange on the
858 fitting? Have you a gauge with marks on it?

A. Here, we can measure that by noting that it is approximately, oh, what do you say, 1/16 or 1/32 of an inch? What I am trying to do here is to measure by using the width of the very narrow rule which Mr. Koenig hands me.

Mr. Koenig: Here is a pair of dividers. Perhaps that will serve.

The Witness: The dividers are much too big to go in. That is, the space is so slight that the ends of the feelers won't go between, but I note that the distance—we can measure the width of this scale, which is a very narrow scale, and it looks to me as though the distance is—

Mr. Williams: Put a micrometer on it.

The Witness: That doesn't do any good because the scale won't go into the space anyway.

Mr. Williams: Well, go ahead.

Mr. Koenig: Let us agree on this. Would you say
859 468 it is 1/32 less than the thickness of the scale?

The Witness: Yes, yes, at least that.

Mr. Koenig: Now, what is the width of the scale, the thickness, that I have been referring to?

The Witness: The thickness of the scale is slightly over 3/16 of an inch.

Mr. Koenig: So that that would make a net of 5/32 as the width of the space between the bottom of the coupler and the top of the flange on the fitting?

The Witness: It is very close to that. Now I release the pressure in the gauge and back off the compressor.

Mr. Koenig: May I ask, when you do that does the coupling now rock on the fitting?

The Witness: Yes, the grip is relaxed and it just works back and forth very easily. And then with a tug I pull it off.

Mr. Williams: Q. Does that mean that you secured a mechanical grip and a seal that prevented leakage and delivered grease under pressure of 1,500 pounds, and removed the coupler from the fitting?

A. Yes.

Q. Satisfactorily?

860 A. Yes, removed it with a straight tug.

Mr. Haynes: The defendants rest.

Mr. Williams: The plaintiff rests.

The Court: You don't want to argue this case now, gentlemen?

Mr. Williams: I would be glad to.

The Court: I don't want to hear any argument on it now. I would rather have briefs submitted and take it up in my own chambers where I won't be disturbed, if that is satisfactory to you.

Mr. Haynes: It is satisfactory to the defendants, your Honor.

469 Which was all the evidence offered and received and proceedings had upon the hearing of the above entitled cause.

470 IN THE UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

ORDER APPROVING STATEMENT OF EVIDENCE.

This cause coming on for hearing upon motion of defendant to approve Statement of Evidence; it is hereby

Ordered:

1. That the foregoing Statement of Evidence is approved.

2. That wherever in the said Statement of Evidence the testimony appears in the exact words of the witness, it is so desired by the parties and directed by the Court.

3. That the said Statement of Evidence is true, complete and properly prepared, and together with the exhibits identified in the praecipe, which are hereby made a part of this Certificate of Evidence and are ordered to be certified to the United States Circuit Court of Appeals for the Seventh Circuit, are and do constitute all the evidence offered by the parties or considered by the Court in this cause.

Walter C. Lindley,
United States District Court.

Approved:

Lynn A. Williams,
Counsel for Plaintiff.

Delos G. Haynes,
Counsel for Defendant.

Corporate.

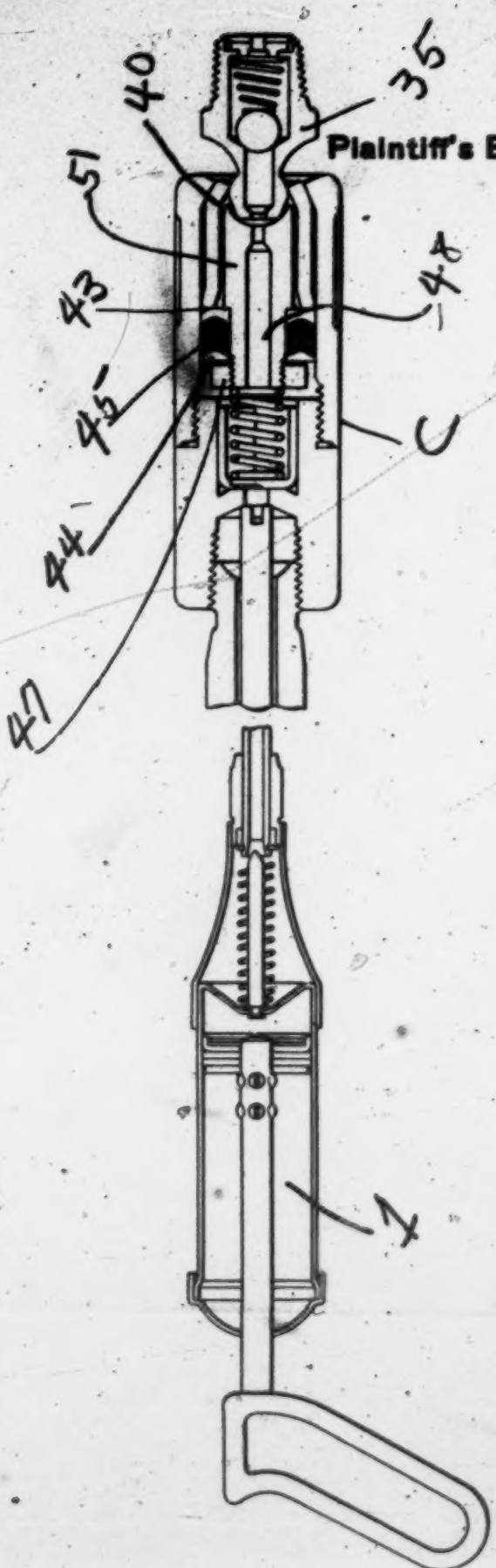
481 **PLAINTIFF'S EXHIBIT 28.**

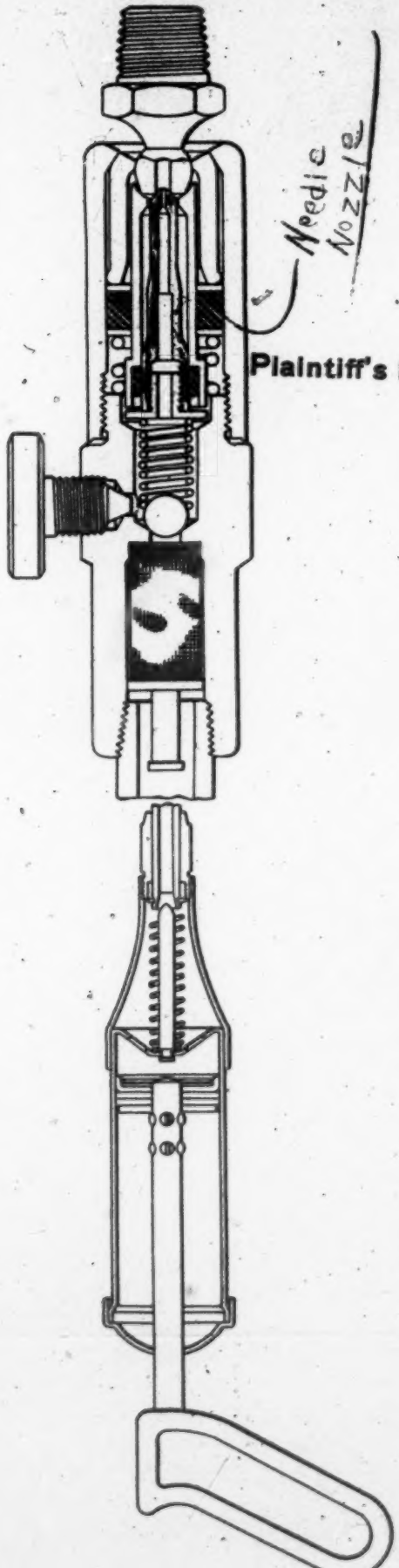
Plaintiff's Interrogatory No. 6, and Faville's Answer Thereto.

"(6) Did the defendant Lincoln Engineering Co. of Illinois, within six years prior to the filing of the supplemental bill of complaint herein at Chicago, Illinois, sell the lubricating equipment known as the 'Lincoln Kleenseal' lubricant receiving fittings 'No. 5000' and 'No. 5300,' which may be inspected at the office of plaintiff's solicitors?

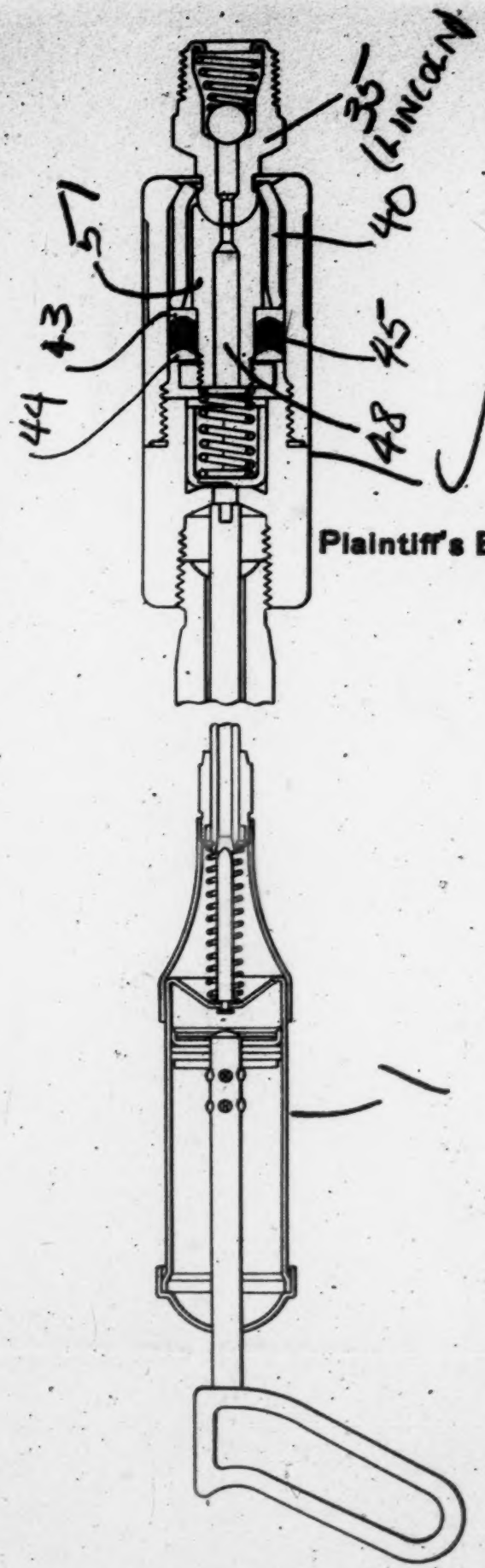
"Yes, or a duplicate thereof."

Plaintiff's Exhibit 34

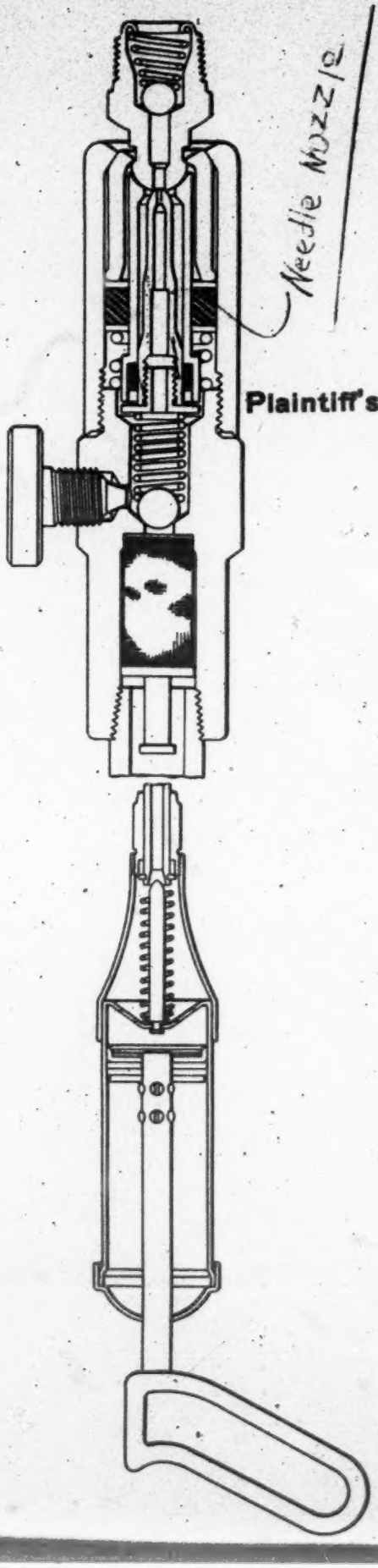




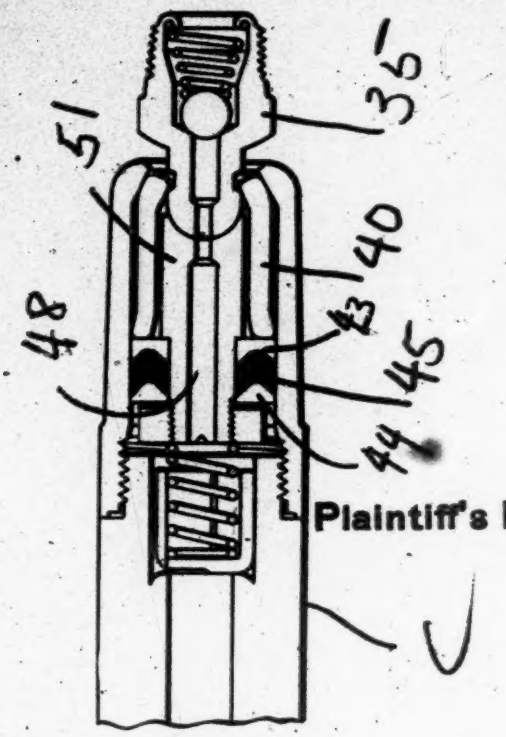
Plaintiff's Exhibit 35



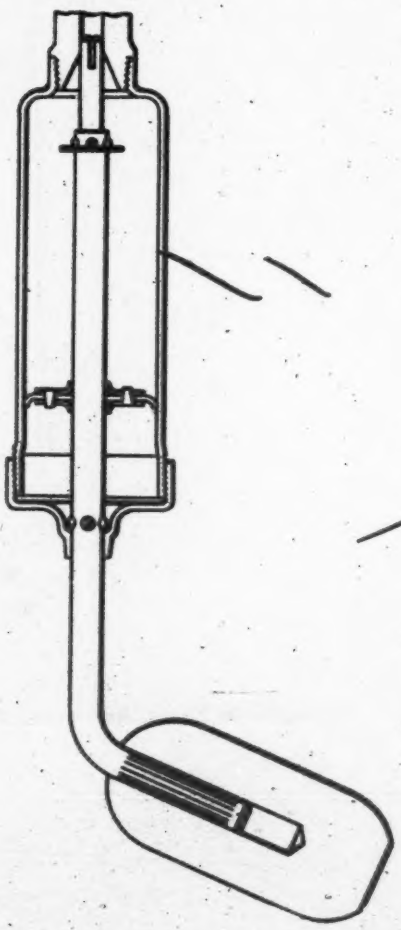
Plaintiff's Exhibit 36



Plaintiff's Exhibit 37



Plaintiff's Exhibit 38



Plaintiff's Exhibit 39

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILL.
EASTERN DIVISION

STEWART-WARNER CORPORATION
vs.
LE VALLY et al

EQUITY NO. 13,955

PLAINTIFF'S EXHIBIT 39

PLAINTIFF'S EXHIBIT 43

Tabulation of lubriguns sold to the Bassick Manufacturing Company, Alemite Corporation and Stewart-Warner-Alemite Corporation, by Lincoln Steel & Forge Company and Lincoln Engineering Company, listed by model numbers for years indicated.

Year	P-8	P-25	P-75	1093	L-25	L-75	5076	5128	5158	5138	5148	5165	5166	5146	5164	5176	5346	Total
1925		39																39
1926	835	4947	12															5794
1927	243	11034	355															11632
1928	48	14666	536	26														15276
1929	32	9138	815	107	2647	96	15											12848
1930	17	3542	515	93	2914	170	112	2853	25	34								10275
1931	8	1360	188	58	709	68	26	1145	265	40	221	37	88	434	945	5		5507
1932		298	99	5	169	11	6	393	122	95	70	56	57	89	938	9	454	2871
1933		119	18	8	51	2	5	250	52	16	118						110	749
Total	1183	45141	2538	297	6490	347	164	4641	464	185	409	93	145	523	1883	14	564	65061

Retail market value of lubriguns sold to Bassick Manufacturing Company, Alemite Corporation and Stewart-Warner Alemite Corporation, by Lincoln Steel & Forge Company and Lincoln Engineering Company, listed by model numbers for years indicated. Retail market values arrived at from published list prices shown in Alemite Catalogues for respective years after deducting value of hose and other accessory items cataglogued with the several models but not furnished by Lincoln Steel & Forge Company and Lincoln Engineering Company.

Year	P-8	P-25	P-75	1093	L-25	L-75	5076	5128	5158	5138	5148	5165	5166	5146	5164	5176	5346	Total
1925		$ 3,378.96																$ 3,378.96
1926	$ 63,994.40	428,608.08	$ 3,000.00															495,602.48
1927	18,623.52	955,985.76	88,750.00															1,063,359.28
1928	3,678.72	1,270,662.24	135,099.68	$ 9,254.70														1,418,695.34
1929	2,452.48	791,543.04	183,375.00	38,086.65	$ 316,157.68	$ 26,400.00	$ 4,500.00											1,362,514.85
1930	1,302.88	306,878.88	115,875.00	33,103.35	348,048.16	46,750.00	33,600.00	$ 89,584.20	$ 685.25	$ 1,075.42								976,903.14
1931	613.12	113,410.40	40,200.00	20,645.10	81,532.96	18,350.00	7,450.00	34,453.00	7,263.65	1,245.20	$ 7,697.73	$ 1,022.31	$ 2,351.44	$ 20,241.76	$ 25,893.00	$ 1,500.00		384,159.67
1932		22,338.72	19,305.00	1,779.75	17,650.36	2,750.00	1,650.00	10,375.20	3,344.02	2,529.85	2,039.10	1,547.28	1,717.41	4,150.96	25,701.20	2,700.00	$ 20,334.56	159,413.21
1933		9,120.16	3,510.00	2,847.60	5,326.44	500.00	1,375.00	6,600.00	1,425.32	426.08	3,437.34						9,530.40	44,096.54
	$ 90,665.12	$3,902,426.24	$ 589,054.68	$ 105,717.15	$ 768,715.60	$ 94,750.00	$ 48,575.00	$ 141,012.40	$ 12,718.24	$ 5,276.55	$ 13,174.17	$ 2,569.59	$ 4,368.85	$ 24,392.72	$ 51,504.20	$ 4,200.00	$ 48,964.96	$5,908,075.67

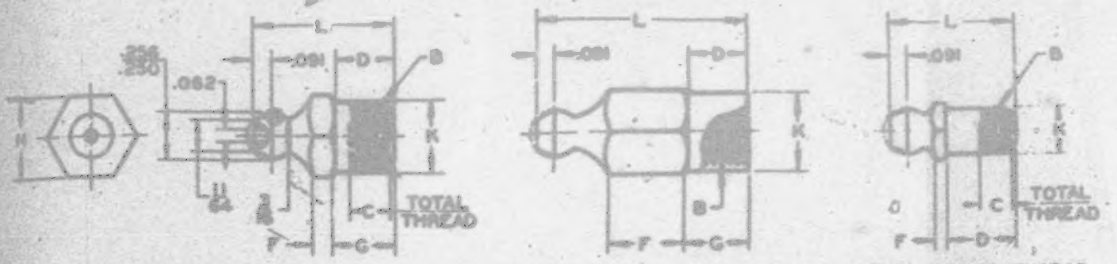
Oct. 1, 1935.
Filed July 11, 1936.

Plate 575-I
Oct. 17, 1935.

Plaintiff's Exhibit 45A

GENERAL MOTORS STANDARDS

TYPE C STRAIGHT LUBRICATION FITTINGS

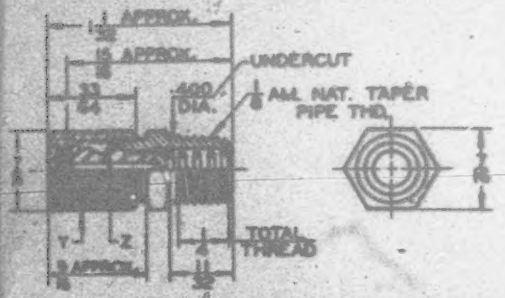


EXTERNAL PIPE THREAD — INTERNAL PIPE THREAD — SPECIAL TAPER THREAD

	EXTERNAL PIPE THREAD			INTERNAL PIPE THREAD	SPECIAL TAPER THREAD		
	With Ball & Spring	Without Ball & Spring	With Ball & Spring	With Ball & Spring	With Ball & Spring		
Thread Size	1/8	1/8	1/8	1/8	1/4-28	1/4-28	1/4-28
Thread Length (Short)	3/16	–	3/16	–	7/64	–	–
Thread Length (Long)	–	5/16	–	–	–	15/64	15/64
Shank Length (Approx)	9/32	5/16	9/32	11/32	5/16	3/8	3/8
Hexagon Thickness (Approx)	9/64	9/64	9/64	9/32	7/16	1/16	1/16
Ball to Hexagon (Approx)	5/16	25/32	5/16	3/8	–	–	–
Hexagon Width	7/16	7/16	7/16	9/16	1/2	5/16	5/16
Shank Diameter	.400	.400	.400	.540*	.495-.485	.260	.260
Overall Length (Approx)	3/4	1-1/4	3/4	1	1-7/64	1/2	11/16	15/16
Material & Finish	G.M. Part Number For Short Thread Fitting						
Steel-Cadmium Ball	119512		111878		110347		
	G.M. Part Number For Long Thread Fitting						
Steel-Cadmium Ball		109352		109388	109349	111995	125846

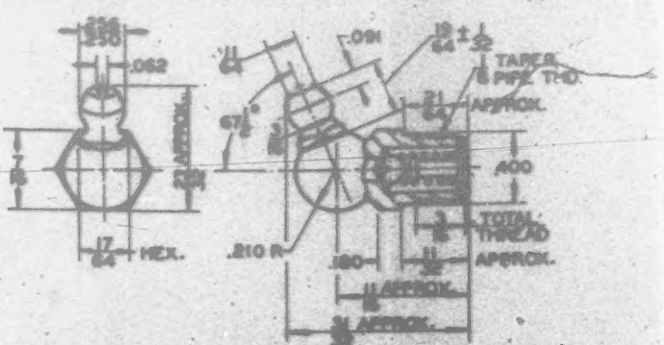
*Clearance between Thread and Hexagon to .440

TYPE C WATER PUMP LUBRICATION FITTINGS



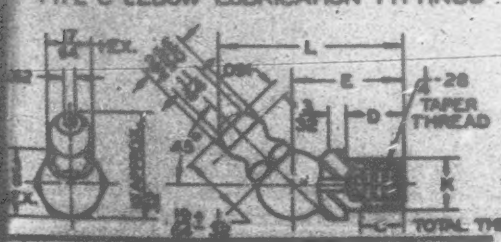
Finish Plain-	G.M. Part Number	Finish Nickel-Ball	G.M. Part Number
Cup-T(Brass)	126090	Cup-T(Brass)	126091
Tip-S(Steel)	126080	Tip-S(Steel)	126060
Assembly	119509	Assembly	109377

TYPE C ELBOW LUBRICATION FITTINGS



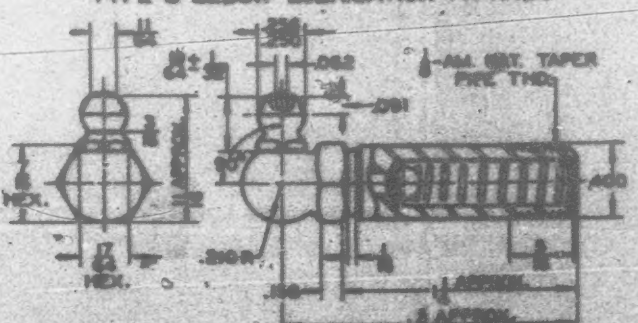
Material & Finish	G.M. Part Number.
Steel-Cadmium Ball	111669

TYPE C ELBOW LUBRICATION FITTINGS



Thread Length	7/64	15/64
Shank Length	5/16	5/16
Ball to Center	15/32	15/32
Shank Diameter	.260	.260
Overall Length	7/8	1
Material & Finish	G.M. Part Number	
Steel-Cadmium Ball	110309	110326

TYPE C ELBOW LUBRICATION FITTINGS



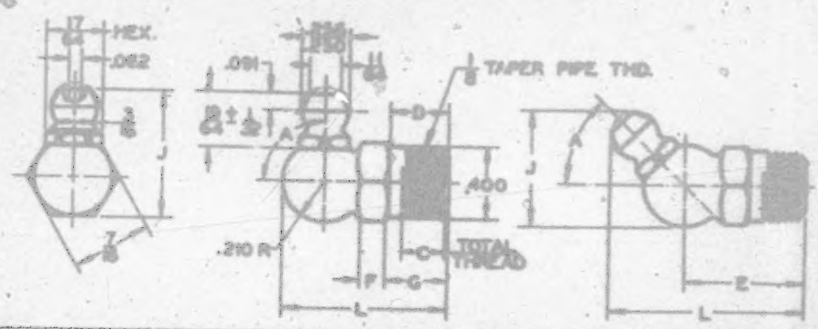
Steel-Cadmium Ball	G.M. Part Number - 109352

Note: For General Specifications see Page B-10

Plaintiff's Exhibit 45B

GENERAL MOTORS STANDARDS

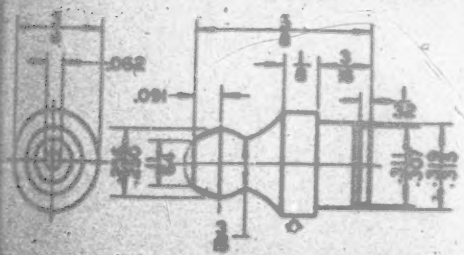
TYPE C ELBOW LUBRICATION FITTINGS



	With Ball & Spring			Without Ball & Spring	With Ball & Spring		Without Ball & Spring	With Ball & Spring	Without Ball & Spring	With Ball & Spring	Without Ball & Spring
Angle	30°	30°	30°	30°	67-1/2°	67-1/2°	67-1/2°	90°	90°	105°	105°
Thread Length (Short)	3/16	-	-	3/16	3/16	-	-	3/16	-	-	-
Thread Length (Am. Std.)	-	5/16	5/16	-	-	5/16	5/16	-	1/4	1/4	1/8
Shank Length (Approx.)	9/32	1-7/32	*	9/32	9/32	9/32	9/32	9/32	9/16	9/16	9/16
Ball to Center (Approx.)	5/8	1-39/64	1-39/64	5/8	5/8	5/8	43/64	5/8	55/64	55/64	55/64
Hex. Thickness (Approx.)	7/16	5/32	*	7/16	7/16	7/16	5/32	3/16	5/16	5/16	5/16
Ball to Hexagon (Approx.)	5/16	1-1/4	*	5/16	5/16	5/16	5/16	5/16	11/32	11/32	11/32
Overall Height (Approx.)	9/16	9/16	9/16	9/16	23/32	23/32	23/32	11/16	11/16	11/16	11/16
Overall Length (Approx.)	1-5/32	2-1/8	2-1/8	1-5/32	29/32	1-5/16	25/16	27/32	7/8	1-5/64	1-5/64
Material & Finish	G.M. Part Number For Short Thread Fitting										
Steel-Cadmium Dull	109353			180189	109350			109354			
	G.M. Part Number For Long Thread Fitting										
Steel-Cadmium Dull		111389	180179			109365	109378		109366	109385	180139

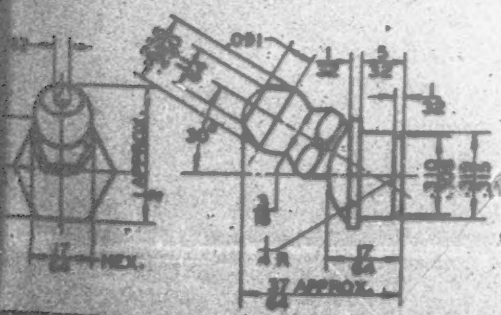
* 7/16 Hex. in Body

TYPE C DRIVE BASE LUBRICATION FITTINGS



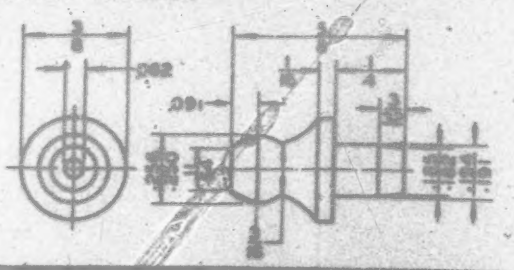
	With Ball & Spring	Without Ball & Spring
Material & Finish	G.M. Part Number	
Steel-Cadmium Dull	119516	109358

TYPE C DRIVE BASE LUBRICATION FITTINGS



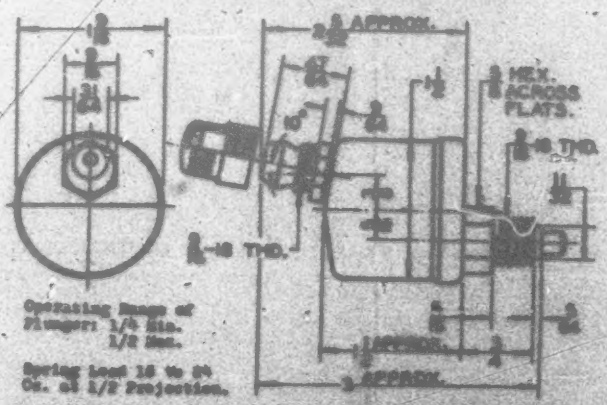
	Without Ball & Spring
Material & Finish	G.M. Part Number
Steel-Cadmium Dull	109366

For General Specifications see Page R-10



	Without Ball & Spring
Material & Finish	G.M. Part Number
Steel-Cadmium Dull	116161

TYPE D STEERING KNUCKLE PIN OILER



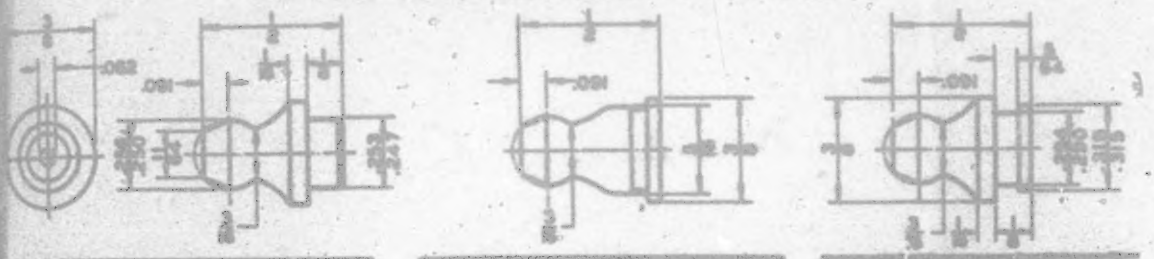
Steel-Cadmium Dull	G.M. Part Number - 115146

Page Tightly Bound

Plaintiff's Exhibit 46A

GENERAL MOTORS STANDARDS

TYPE C RIVET BASE LUBRICATION FITTINGS

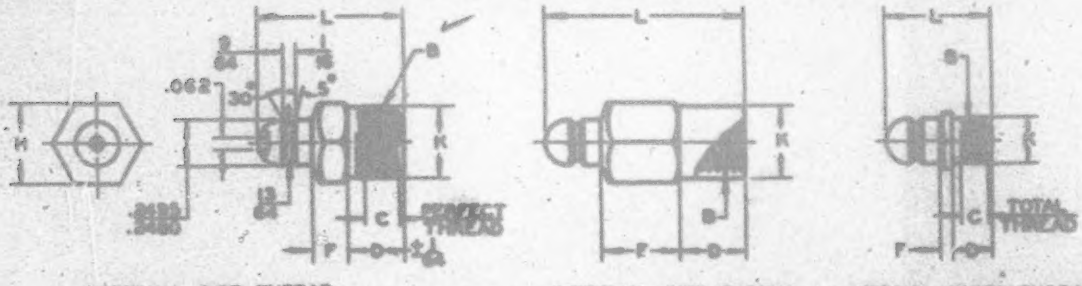


	Without Ball & Spring
Material & Finish	G.M. Part Number
Steel-Cadmium Ball	109351

	With Ball & Spring
Material & Finish	G.M. Part Number
Steel-Cadmium Ball	117251

Material & Finish	Without Ball & Spring
	G.M. Part Number
Steel Cad. Ball	111289

TYPE D STRAIGHT LUBRICATION FITTINGS

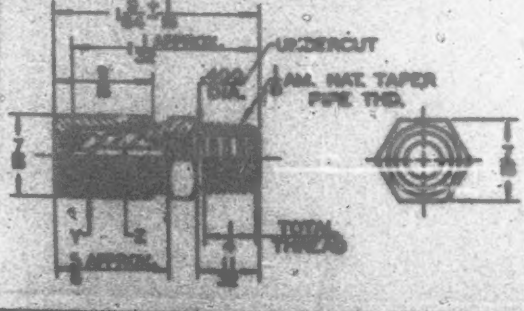


EXTERNAL PIPE THREAD — INTERNAL PIPE THREAD — SPECIAL TAPER THREAD

		EXTERNAL PIPE THREAD				INTERNAL PIPE THREAD	SPECIAL TAPER THREAD		
		With Ball & Spring		Without Ball & Spring	With Ball & Spring	With Ball & Spring	With Ball & Spring		
B	Thread Size	1/8	1/8	1/8	1/4	1/8	1/4-28	1/4-28	1/4-28
C	Thread Length (Short)	3/16	-	3/16	-	-	7/64	-	-
D	Thread Length (Am. Nat.)	-	5/16	-	1/4	-	-	7/32	7/32
D	Shank Length	19/64	45/64	19/64	11/32	5/16	13/64	23/64	39/64
F	Hexagon Thickness	3/16	3/16	3/16	3/8	1/2	1/16	1/16	1/16
H	Hexagon Width	7/16	7/16	7/16	9/16	1/2	5/16	5/16	5/16
K	Shank Diameter	.400	.400	.400	.540*	.495-.485	.260	.260	.260
L	Overall Length	25/32	1-1/4	25/32	1-1/64	1-7/64	9/16	23/32	31/32
	Material & Finish	G.M. Part Number For Short Thread Fitting							
	Steel-Cadmium Ball	109461		126058			109454		
		G.M. Part Number For Long Thread Fitting							
	Steel-Cadmium Ball		126121		126132	126122		126129	126131

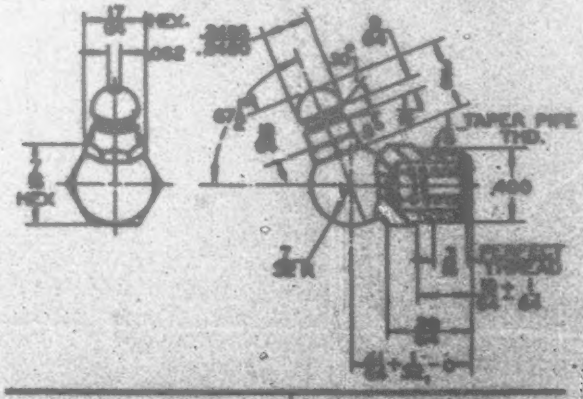
*Undercut between Thread and Hexagon to .440

TYPE D WATER PUMP LUBRICATION FITTINGS



Finish Plate	G.M. Part Number	Finish Nickel-Ball	G.M. Part Number
Cap-T (Brass)	126095	Cap-T (Brass)	126096
Tip-S (Steel	126080	Tip-S (Steel)	126080
Assembly	117178	Assembly	126097

TYPE D ELBOW LUBRICATION FITTINGS



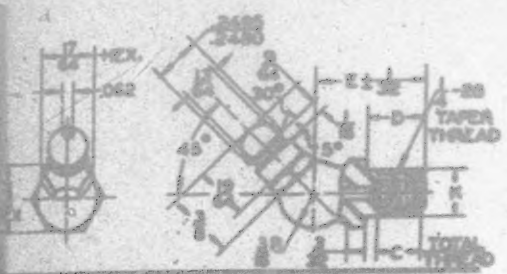
Material & Finish	G.M. Part Number
Steel-Cadmium Ball	117177

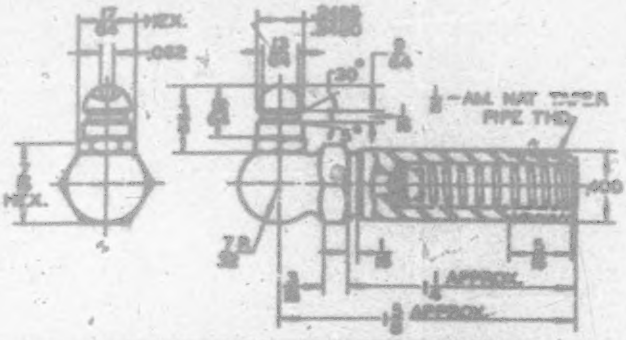
Note: For General Specifications see Page R-16

Plaintiff's Exhibit 46B

GENERAL MOTORS STANDARDS

TYPE D ELBOW LUBRICATION FITTINGS

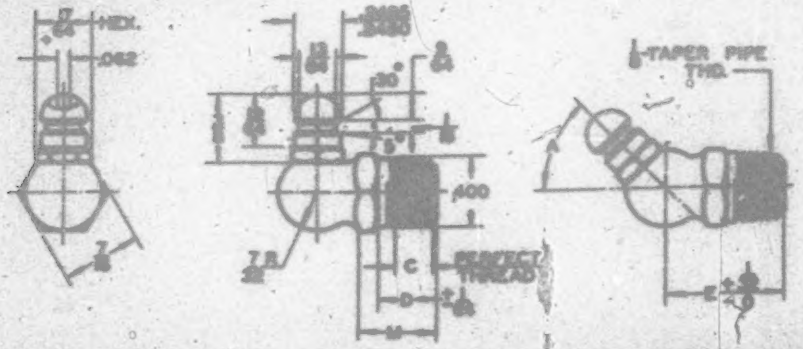




Thread Length (Approx)	7/64	7/32
Shank Length	13/64	5/16
End to Center	15/32	15/32
Shank Diameter	[illegible]	[illegible]
Material & Finish	G.M. Part Number	
Steel-Cadmium Ball	117175	117176

Steel-Cadmium-Ball	G.M. Part Number - 126112

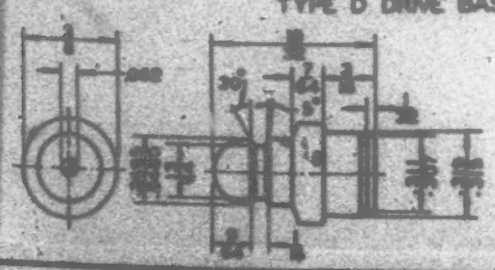
TYPE D ELBOW LUBRICATION FITTINGS

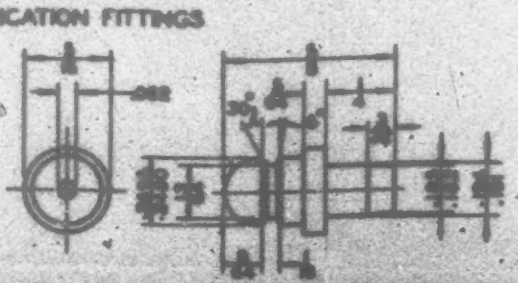


	With Ball & Spring			Without Ball & Spring	With Ball & Spring	Without Ball & Spring	With Ball & Spring	Without Ball & Spring	With Ball & Spring	Without Ball & Spring	With Ball & Spring	Without Ball & Spring
Angle	30°	30°	30°	30°	45°	45°	67-1/2°	67-1/2°	90°	90°	105°	105°
Thread Length (Short)	3/16	-	-	3/16								
Thread Length (Am. Int.)	-	5/16	5/16	-								
Shank Length	19/64	1-7/32	1-39/64	19/64								
End to Center	41/64	1-39/64	1-39/64	41/64								
Length Over Hexagon	29/64	1-3/8	1-39/64	29/64								
Material & Finish	G.M. Part Number For Short Thread Fitting											
Steel-Cadmium Ball	109459			126111	126152	126159	109460	126112	109462	126113	126114	126119
	G.M. Part Number For Long Thread Fitting											
Steel-Cadmium Ball		126116	126117									

Be 7/16 Hex. in Body

TYPE D DRIVE BASE LUBRICATION FITTINGS





	With Ball & Spring	Without Ball & Spring
Material & Finish	G.M. Part Number	
Steel-Cadmium Ball	[illegible]	109455

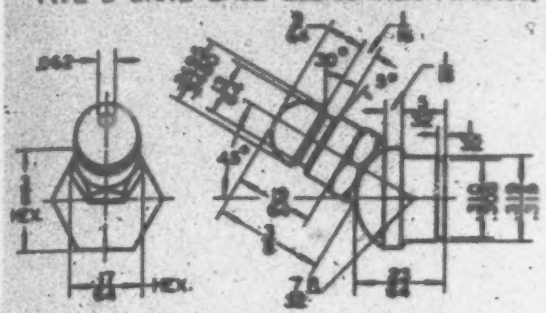
	Without Ball & Spring
Material & Finish	G.M. Part Number
Steel-Cadmium Ball	[illegible]

For General Specifications see Page [illegible]

Plaintiff's Exhibit 46C

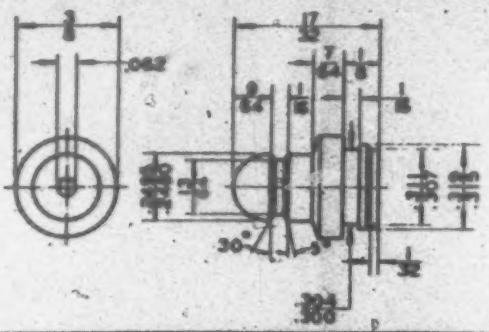
GENERAL MOTORS STANDARDS

TYPE D DRIVE BASE LUBRICATION FITTINGS



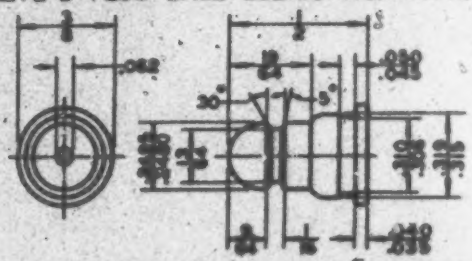
Material & Finish	Without Ball & Spring G.M. Part Number
Steel-Cadmium Ball	185743

TYPE D RIVET BASE LUBRICATION FITTINGS



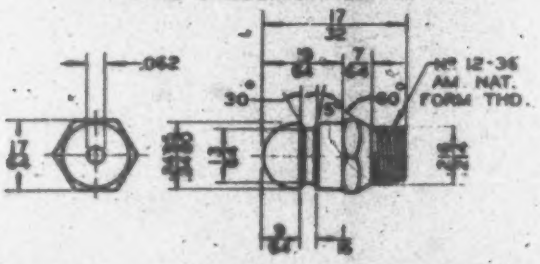
Material & Finish	Without Ball & Spring G.M. Part Number
Steel-Cadmium Ball	117021

TYPE D PLUG-BASE LUBRICATION FITTING



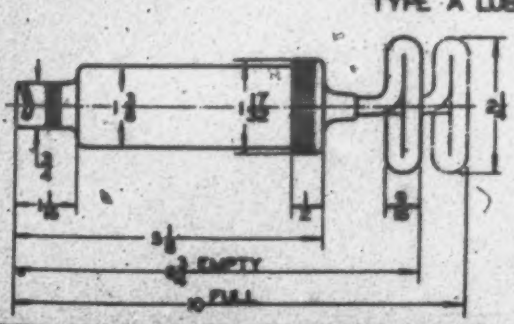
Material & Finish	Without Ball & Spring G.M. Part Number
Steel-Cadmium Ball	185695

TYPE D LUBRICATION TIP

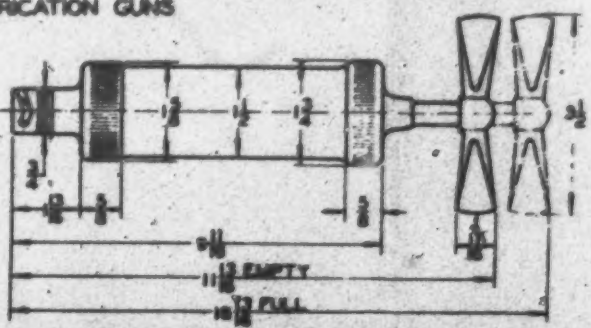


Material & Finish	G.M. Part Number
Steel-Cadmium Ball	185696

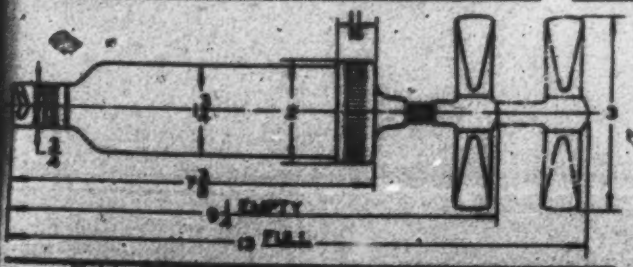
TYPE A LUBRICATION GUNS

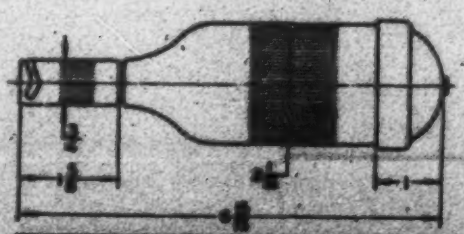


Finish	G.M. Part Number
Nickel-Ball	116472



Finish	G.M. Part Number
Nickel-Ball	185200





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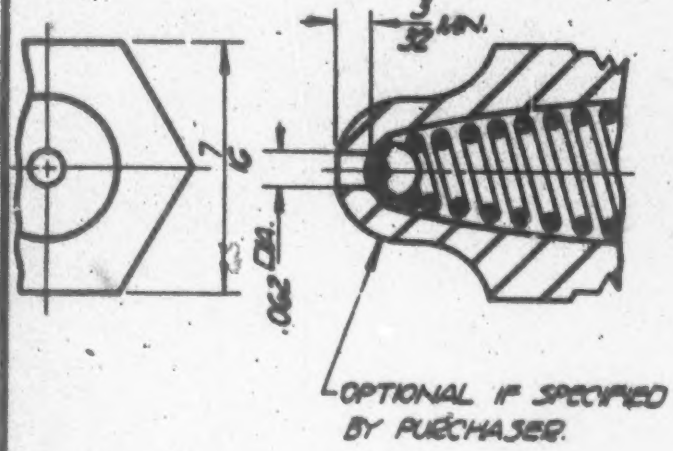
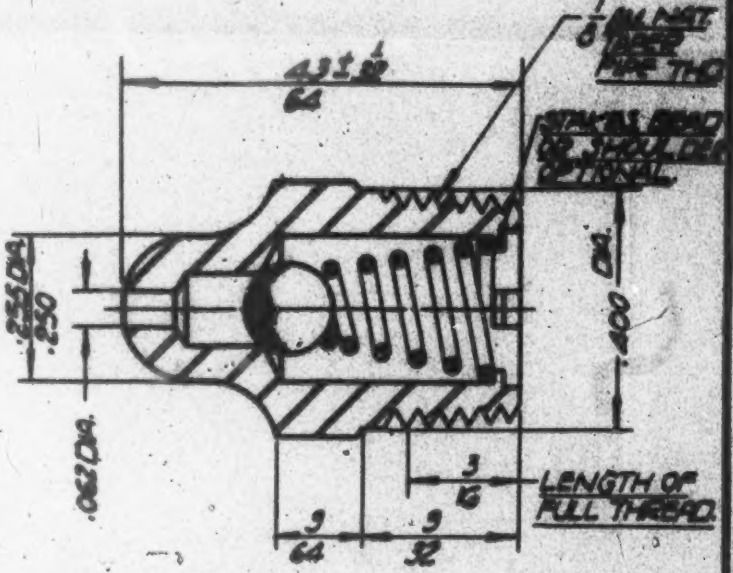
Plaintiff's Exhibit 47

GENERAL MOTORS
APPROVED STANDARDS
STANDARDS SECTION
DETROIT, MICHIGAN

109461





SCALE: 4 TIMES SIZE.
MUST CONFORM TO GENERAL SPECIFICATIONS FOR LUB. FITTINGS PUBLISHED IN S.A.E. STANDARDS. TOLERANCE ± .005 UNLESS OTHERWISE SPECIFIED.

		DESCRIPTION: 1/8 PIPE THD.	FINISH: CADMIUM PLATED-DULL	MATERIAL: STEEL - SEE NOTE
2-3-46	A	MISCELLANEOUS MINOR REVISIONS PROPOSED		NAME: STRAIGHT LUBRICATION FITTING
DATE	LET.	REVISIONS	BY	109461

Plaintiff's Exhibit 48

STANDARDS SECTION

GENERAL MOTORS APPROVED STANDARDS

DETROIT, MICHIGAN

RELEASED

DESCRIPTION	FINISH	MATERIAL
—	BODKIN PLATED DULL	STEEL

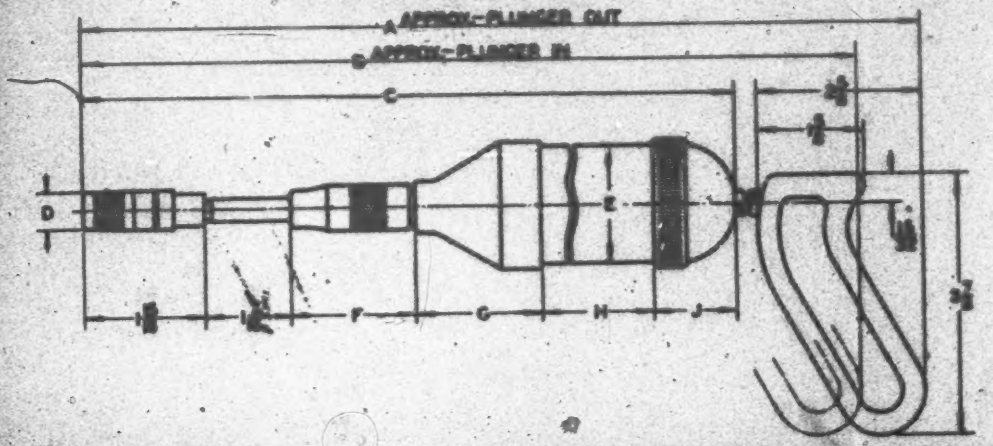
NAME: ELBOW LUBRICATION FITTING

10-C 462

Plaintiff's Exhibit 49

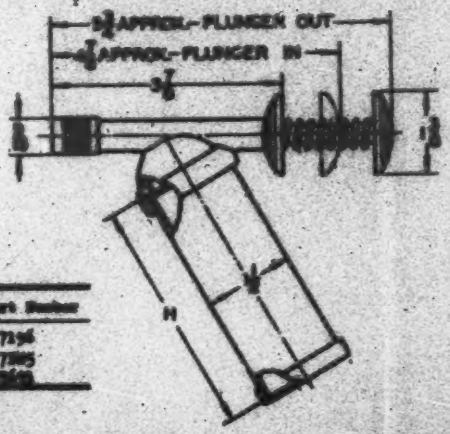
GENERAL MOTORS STANDARDS

TYPE C LUBRICATION GUNS—CONTINUED



Capacity	Finish	G.M. Part Number	A	B	C	D	E	F	G	H	J
2 Ounces	Nickel-Bull	110179	18-3/8	15-1/4	11-9/16	11/16	1-3/4	1-1/64	3-1/16	3-1/8	61/64
5 Ounces	Nickel-Bull	111573	[illegible]	16-1/2	13-1/8	5/8	2	2-1/8	2-1/8	2-3/16	1-3/16

TYPE D LUBRICATION GUNS



H	Capacity	Finish	G.M. Part Number
3	2 Ounces	Cadmium-Bull	117196
4	3 Ounces	Cadmium-Bull	117[illegible]
6	5 Ounces	Cadmium-Bull	[illegible]

GENERAL SPECIFICATIONS

Material: Fittings shall be brass or steel as indicated in the detailed specifications on preceding pages. Brass shall be G.M. [illegible] or equivalent. Steel shall be G.M. [illegible] or equivalent. The pressing end of Type C and Type D fittings shall be cyanided or otherwise hardened sufficiently to resist scoring by guns or couplers and damage from stones. The material in guns shall be in accordance with manufacturer's practice.

Tip: On Type C and Type D the .[illegible] dia. hole in tip of fittings shall be round and free from burrs. It shall be concentric within .005" with the outside surfaces of the tip. The depth of hole shall be not less than 1/16".

Finish: The plating on fittings and guns shall meet the requirements specified in G.M. plating specifications [illegible], Class B or [illegible], Class C.

Manufacture: Fittings and guns shall be free from burrs, sharp edges and any other defects that might affect their serviceability.

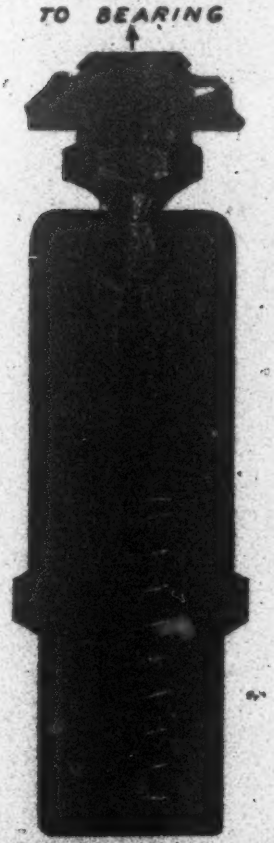
Patents: Specifications in this section for fittings and guns are given without considering whether patents may or may not be involved. In all cases, therefore, the supplier should be required to assume patent liability.

PLAINTIFF'S EXHIBIT 52-A.

Alemite Hydraulic Connection

Alemite Corporation
1826 Diversey Pkwy., Chicago, Ill.

Pressures exceeding 10,000 lbs. per square inch without leakage may be obtained with a hand operated grease gun incorporating this



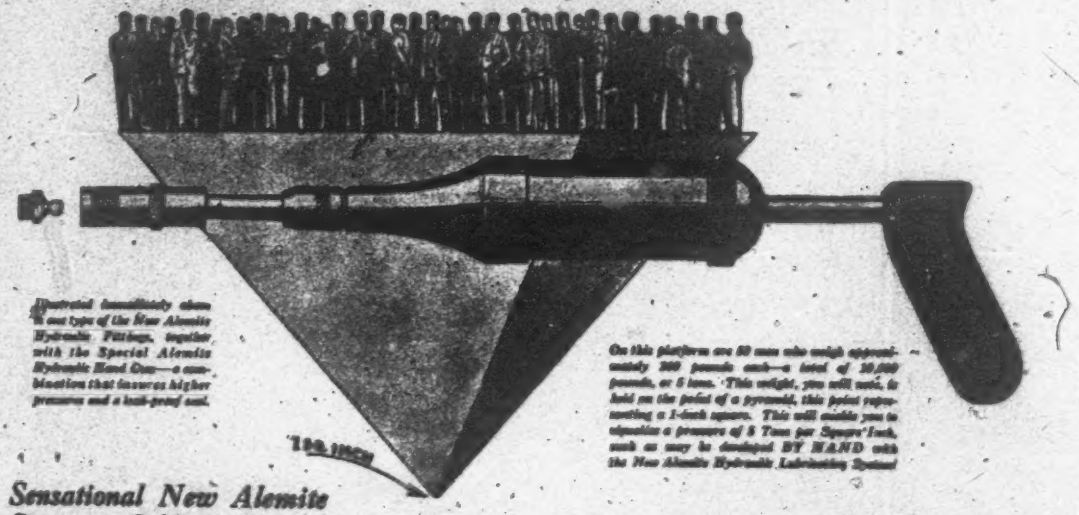
new hydraulic connection. These new couplings which will permit operating pressures of mechanical lubricating systems to be stepped up to their maximum are now being made available to service stations which can change over to the new system by attaching inexpensive adapter fittings. The higher the pressure the tighter the seal. That, in brief, is the distinctive feature of the new couplings. It is a distinctive improvement over those fittings which have been offered in the past.

30 Aut

Automotive Journal, Motor Row and Garage Dealer - August, 1933

Implement & Tractor Trade Journal, March 24, 1934 Plaintiff's Exhibit 52-B

5 TONS PRESSURE PER SQUARE INCH Developed by New Alemite Hydraulic Lubrication System!



Illustrated immediately above is one type of the New Alemite Hydraulic Fittings, together with the Special Alemite Hydraulic Hand Gun—a combination that insures a higher pressure and a leak-proof seal.

On this platform are 10 men who weigh approximately 200 pounds each—a total of 10,000 pounds, or 5 tons. This weight, you will note, is held on the point of a pyramid, this point representing a 1-inch square. This will enable you to visualize a pressure of 5 Tons per Square Inch, such as may be developed BY HAND with the New Alemite Hydraulic Lubricating System!

1 SQ. INCH

Sensational New Alemite System Offers You 3 Separate Channels for PROFIT

THE New Alemite Hydraulic Lubrication System is as great a sensation today as the original Alemite System was 15 years ago. It is another tremendous step forward in modern lubrication.

This New Hydraulic System is hot off the griddle. 99% of 1934 motor cars have it as standard equipment.

It is even more important in the lubrication of farm implements and tractors. In fact, the New Alemite Hydraulic System offers you new profit channels RIGHT NOW. There are 3 ways in which you will profit by selling this new system for replacement of old-type fittings:

First: In the sale of New Alemite Hydraulic Fittings for farm equipment already in service. There's a nice profit for you on every piece of machinery you "change over" to the new system!

Second: In the sale of Alemite Farm Lubricants which such contacts make possible. What better time to convince the power operator of the need of *better lubricants* than when you are demonstrating a *better lubrication system?*

Third: In the sale of additional farm equipment. Long experience in selling shows that the best time to solicit *new equipment business* is when you are rendering a valuable service on old equipment. Many a big sale has resulted from approaching a prospect on his "blind side" with a little sale.

Greatest Advance in Lubrication History!

This new system makes possible the development of pressures up to 10,000 pounds per square inch—BY HAND—with an Alemite Hand Gun. By changing present fittings to the New Alemite Hydraulic type—an easy process—EVERY LUBRICATION POINT ON FARM IMPLEMENTS AND TRACTORS IS INSURED POSITIVE LUBRICATION. You cannot fail to force out the old, worn, dirty lubricant, because you have the necessary pressure. There can be no lubricant leakage at the nozzle or fitting, for THE HIGHER THE PRESSURE, THE TIGHTER THE SEAL!

These Profits BELONG TO YOU!

Every farm implement and tractor you have sold for years past is a prospect for Alemite Hydraulic Fittings. One demonstration is enough to do the selling. They literally sell themselves *by Performance!*

SOMEONE IS GOING TO MAKE THE PROFITS FROM THESE SALES! They *belong* to *you. But you have to go out after them to get them!*

Mail coupon today for complete information regarding the New Hydraulic System *and how you can cash in on it this year!*

MAIL COUPON TODAY!

ALEMITE CORPORATION 1234-6

1946 Diversey Parkway, Chicago, Ill.

Please send full information on the new Hydraulic System and how it can earn added profits for me in 1934.

Name_____

Company_____

Address_____

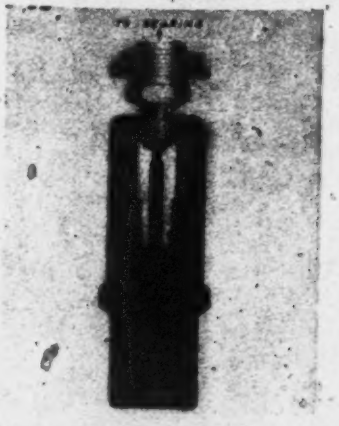
City_____ State_____

7-12 NATIONAL PETROLEUM NEWS
33

A HAND-OPERATED grease gun using an improved coupling featuring the Alemite hydraulic lubricating system is the latest development of Stewart-Warner Corp., 1346 Diversity Blvd., Detroit. Pressures over 10,000 pounds per square inch may be obtained without leakage with this new gun, the manufacturer claims. Service stations may change to the new hydraulic system by attaching inexpensive adopter fittings to their present equipment.

The higher the pressure, the tighter the seal, the company says, is the distinctive feature of the new coupling. It combines both the positive connection feature of the original pin-type fitting and the quick on-and-off and universal alignment features of the push-type. The new style connection grasps the ball-point of the fitting first with a light spring clip when contact is made, then with a vice-like grasp when pressure is applied.

PLAINTIFF'S EXHIBIT 52-C. C



Alemite hydraulic connection for grease gun

PLAINTIFF'S EXHIBIT 52-D.

Lubricator Fitting

PRESSURES exceeding 10,000 lb. per sq.in. without leakage, may be obtained with a hand-operated grease gun incorporating an improved coupling that features the Alemite hydraulic lubricating system. The higher the pressure, the tighter the seal—that, in brief, is the distinctive feature of the new coupling. Actually, the new style connection grasps the ball joint of the fitting, first with a light spring clip when contact is made, then with a vice-like grasp as pressure is applied. A small piston in the outlet tube, forced forward by the pressure of the grease, moves three steel jaws forward into the tapering tip of the outer tube, forcing them to close firmly around the ball tip fitting. Besides effecting better lubrication, the hydraulic system facilitates the work of the operator, cutting time and trouble from the job.

BUS TRANSPORTATION • July, 1925

WARNING! Plaintiff's Exhibit 52-E —Unless You Have

Adapters and Fittings for the New ALEMITE HYDRAULIC SYSTEM

You Cannot Adequately Service 99% of the New 1934 Motor Cars!

Alemite Hydraulic Fitting with Cross-sectional View of Coupling

Extra Profits for You Through Service and Replacement Sales for this Sensational New System

THE New Alemite Hydraulic Lubrication System is standard equipment on 99% of all 1934 motor cars. This system includes entirely new-type fittings. The cross-sectional view presents one of these; showing how the new adapter (attachable to your present guns) makes a perfect, sealed connection as long as pressure is applied.

Secure necessary adapters for this new Hydraulic System at once. Don't let any 1934 model lubrication service job get away from you!

Money in Replacement Business!

Also, order at once a complete kit of Alemite Hydraulic System Fittings. This kit will enable you: 1. To replace any fittings on 1934 models. 2. To replace old-type fittings (on older cars) with the most modern lubrication fittings.

There will be plenty of money made in both of these services. Get YOURS!

This new Alemite Hydraulic Lubrication System is as great an advance in modern lubrication service as was the original Alemite System. Read the basic principles of this new system, briefly explained below.

See Your Jobber Or Write Us Today. Don't Let Any Of This Business Escape You. It Means Extra Profits For You In 1934!

The Basic Principle of Alemite's New Hydraulic Lubrication System!

This new system embodies a new principle of applying lubricant through new fittings. It cuts time, labor and lubricant required to service bearings and assures positive lubrication under any and all conditions.

A coupling of entirely new design is used in combination with a new-style fitting or nipple to effect the most perfect seal which has ever been possible. This coupling actually grips the fitting so quickly that contact between gun and any fitting is established instantly.

The coupling STAYS LOCKED on the fitting—cannot slip off—so long as pressure is being applied. As pressure is increased, the grip of the coupling increases—in other words, "the greater the pressure, the tighter the seal."

With this system, it is easily possible to build pressures up to 10,000 pounds per square inch.

Like former Alemite systems, the new Alemite Hydraulic comprises fittings of all necessary angles and sizes, and adequate for both power and hand operated equipment.

ALEMITE CORPORATION 1856 Diversey Parkway, Chicago

Plaintiff's Exhibit 76

Farm Implement News—January 18, 1934

52-6

A 3-way shot at

Extra PROFITS *for 1934*

(You can't miss!)

HAVE you heard about Alemite's sensational, new Hydraulic Lubrication System? A brief description of its principle appears under the cross-sectional view on this page. It has been hailed by automotive and equipment engineers as the most revolutionary advance in lubrication since the invention of the original Alemite System. Proof of its advantages is found in the fact that it is standard equipment on 99% of 1934 automobiles, as well as on a great deal of the latest farm machinery.

How This Spells "Profit" for You!

The new Alemite Hydraulic Lubrication System gives you a 3-Way Shot at Extra Profits for 1934—

First. In the sale of new Alemite Hydraulic Fittings for farm equipment already in service. There's a nice profit for you on every piece of machinery you "change over" to the new system.

Second. In the sale of Alemite Farm Lubricants which such contacts make possible. What better time to convince the power operator of the need of *better lubricants* than when you are discussing a *better lubrication system?*

Third. In the sale of more farm equipment. Long experience has shown that the best time to solicit *new equipment business* is when you approach a prospect on his able service on his old equipment. Many a *big sale* has resulted from a small one. Ask Alemite for details on this!

There is no question of doubt that the new Alemite Hydraulic System offers even *more* dramatic advantages in the lubrication of farm equipment than in the automotive end.

Quickly building the tremendous pressure of 8,000 pounds per square inch, with a hand gun, no lubrication point can fail to receive its full amount of necessary lubricant. It's a boon, a bonanza and a prize for every power operator.

WILL YOU GET *YOUR* SHARE OF THE PROFITS THIS NEW SYSTEM IS READY TO HAND YOU, OR WILL YOU LET THE *OTHER FELLOW* TAKE YOUR SHARE?

The Basic Principle of Alemite's New Hydraulic Lubrication System!

This new system embodies a new principle of applying lubricant through new fittings. It cuts time, labor and lubricant required to service bearings and assures positive lubrication under any and all conditions.

A coupling of entirely new design is used in combination with a new-style fitting or nipple to effect the most perfect seal which has ever been possible. This coupling actually grips the fitting so quickly that contact between gun and any fitting is established instantly.

The coupling STAYS LOCKED on the fitting—cannot slip off—as long as pressure is being applied. As pressure is increased, the grip of the coupling increases—in other words, "the greater the pressure the tighter the seal."

With a regular Alemite Hand Gun and this system it is easily possible to build up a pressure of 8,000 pounds per square inch.

Like former Alemite systems, the new Alemite Hydraulic comprises fittings of all necessary styles and sizes, hand guns and adapters for power-operated equipment.

ALEMITE CORPORATION, Dept. 6, 1826 Diversey Parkway, Chicago, Illinois
Please send full information on the new Hydraulic System and how it can earn added profits for me in 1934.

*Name*_____

*Company*_____

*Address*_____

_____ *State*_____

505

Implement & Tractor Trade Journal, January 27, 1934 Plaintiff's Exhibit 52-Group 33

A 3-way shot at *Extra* PROFITS *for 1934*

(You can't miss!)

HAVE you heard about Alemite's sensational, new Hydraulic Lubrication System? A brief description of its principle appears under the cross-sectional view on this page. It has been hailed by automotive and equipment engineers as the most revolutionary advance in lubrication since the invention of the original Alemite System. Proof of its advantages is found in the fact that it is standard equipment on 99% of 1934 automobiles, as well as on a great deal of the latest farm machinery.

How This Spells "Profit" for You!

The new Alemite Hydraulic Lubrication System gives you a 3-Way Shot at Extra Profits for 1934—

First. In the sale of new Alemite Hydraulic Fittings for farm equipment already in service. There's a nice profit for you on every piece of machinery you "change over" to the new system.

Second. In the sale of Alemite Farm Lubricants which such contacts make possible. What better time to convince the power operator of the need of *better lubricants* than when you are discussing a *better lubrication system?*

Third. In the sale of more farm equipment. Long experience has shown that the best time to solicit *new equipment business* is when able service on his old equipment. Many a *big sale* has resulted from a small one. Ask Alemite for details on this!

There is no question of doubt that the new Alemite Hydraulic System offers even *more* dramatic advantages in the lubrication of farm equipment than in the automotive end.

Quickly building the tremendous pressure of 8,000 pounds per square inch, with a hand gun, no lubrication point can fail to receive its full amount of necessary lubricant. It's a boon, a bonanza and a prize for every power operator.

WILL YOU GET *YOUR* SHARE OF THE PROFITS THIS NEW SYSTEM IS READY TO HAND YOU, OR WILL YOU LET THE *OTHER FELLOW* TAKE YOUR SHARE?

The Basic Principle of Alemite's New Hydraulic Lubrication System!

This new system embodies a new principle of applying lubricant through new fittings. It cuts time, labor and lubricant required to service bearings and assures positive lubrication under any and all conditions.

A coupling of entirely new design is used in combination with a new-style fitting or nipple to effect the most perfect seal which has ever been possible. This coupling actually grips the fitting so quickly that contact between gun and any fitting is established instantly.

The coupling STAYS LOCKED on the fitting—cannot slip off—as long as pressure is being applied. As pressure is increased, the grip of the coupling increases—in other words, "the greater the pressure the tighter the seal."

With a regular Alemite Hand Gun and this system it is easily possible to build up a pressure of 8,000 pounds per square inch.

Like former Alemite systems, the new Alemite Hydraulic comprises fittings of all necessary angles and sizes, hand guns and adapters for power-operated equipment.

ALEMITE CORPORATION, Dept. S, 1826 Diversey Parkway, Chicago, Illinois
Please send full information on the new Hydraulic System and how it can earn added profits for me in 1934.

Name_____

Company_____

Address_____

_____ State_____

PLAINTIFF'S EXHIBIT 52-H.

Hats off-

To Detroit S. A. E.'S.

Who helped put the New ALEMITE Hydraulic System on practically all 1934 models!

When Alemite engineers first perfected the new Hydraulic Lubrication System, Alemite thought it was pretty good. But we did not fully realize just *how good* it was until you and your fellow members adopted it as standard equipment on practically all 1934 models.

For the verdict of S. A. E. is Alemite's only test of whether its efforts are right or not.

The cross-sectional view of one type of the new fittings, coupled by a new-type coupler, is self-explanatory. The basic principle of the new system follows:—

Alemite's new Hydraulic Lubrication System embodies a new principle of applying lubricant through a new type of fitting. It cuts time, labor and lubricant required to service bearings and assures positive lubrication under any and all conditions.

A coupling of entirely new design is used in combination with a new-style fitting or nipple, to effect the most perfect lubrication seal which has ever been possible. This coupling actually grips the fitting so quickly that contact between gun and fitting is established instantly.

The coupling STAYS LOCKED on the fitting—cannot slip off—so long as pressure is being applied. As pressure is increased, the grip of the coupling increases. In other words, "the greater the pressure, the tighter the seal."

With a regular Alemite Hand Gun and this system, it is easily possible to build up a pressure of 8,000 lbs. per square inch. Like former Alemite systems, the new Alemite Hydraulic comprises fittings of all necessary angles and sizes, hand guns and power-operated equipment.

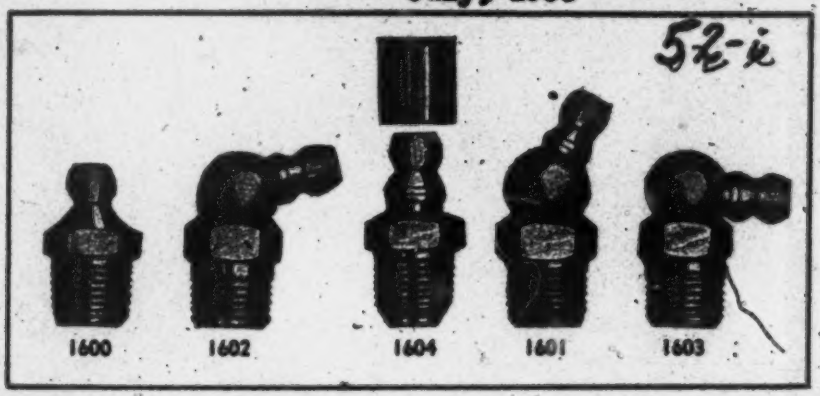
Detroit Supercharger
January, 1934

Chicago, Ill.

PLAINTIFF'S EXHIBIT 52-I.

LUBRICATION MAINTENANCE
July, 1933

52-i



New Fittings Offered By Alemite . .

— by j. howard pile

●Presently the lubrication industry will be working with a new Alemite fitting. The Alemite Corp. of Chicago is already in production on it, and the guns and adapters that go with it. They are called the Alemite Hydraulic System, and the new fitting has been adopted already as original equipment on the Chevrolet, the Ford, the Nash, the Oldsmobile and the Pontiac. Other cars will soon be in the list.

The Hydraulic System combines the locking security of the original Alemite pin-type system with the speed and convenience of the newer push-type system. Moreover, it permits of operating pressures higher than can be obtained with either of the older systems. Whereas 5,000 pounds per square inch is the limit of effective pressure with the push-type system, the new Hydraulic System permits pressures in excess of 10,000 pounds. The complete line of fittings is illustrated above.

The new style coupling snaps on the new style fitting with a barely audible click and forms an instantaneous contact. As pressure is applied it holds the fitting with a vice-like grasp. The higher the pressure the tighter the seal, in brief, is the distinctive feature of the new system. Yet, when the bearing has been lubricated the connection can be broken as easily as it was

formed. It is done merely by inclining the coupling sidewise about 15 degrees. Right, left, up or down; the deflection is equally effective in any lateral direction.

The leak-proof feature of the Hydraulic System gives it three big advantages over earlier pressure systems, effectiveness, cleanliness and economy. And a pressure of 10,000 pounds per square inch, possible even with a hand-operated gun, permits lubricant to be forced through bearings clogged beyond a point where they could be cleared by other methods.

Careful examination of the cross section of the coupling used in the Hydraulic System, reproduced on this page, will show clearly the mechanical principles involved. Steel tube "A" forms the outer casing of the coupling. There are three metal jaws "B", of which two show in the diagram. By slightly depressing spring "F" these jaws move back to accommodate the head of the fitting when the initial contact is made.

Pressure from the spring alone enables the jaws to take hold at once, but as lubricant under pressure is released, "hydraulic" force is exerted against the cup leather washer "D" which is held in place by the nut "E", and locks the coupling securely against the fitting. In the meantime the lubricant flows under pressure through nozzle "C" into the head of the fitting. See the lettered cross section below.

A series of hand guns, comparable in size and purpose to guns of the push-type system, are available now with the new Hydraulic coupling as an integral part of each. All these guns have smaller piston diameters than the guns to which they correspond in the push-type system which, of course, enables the development of higher pressures. The Hydraulic System requires no manual effort whatever on the operator's part to hold a coupling on a fitting. Indeed, it is next to impossible to get the coupling off the fitting by pulling straight back.

Cross section view of the new Hydraulic System coupling attached to a new fitting (No. 1600). Its method of operation is told in the text above.

PLAINTIFF'S EXHIBIT 52-J.

PETROLEUM AGE & SERVICE STATION MERCHANDISING
July, 1955

New Alemite Connection

Pressures exceeding 10,000 pounds per square inch, without leakage, may be obtained with a hand-operated grease gun incorporating an improved coupling that features the Alemite Hydraulic Lubricating System, latest development of the Stewart-Warner—Alemite organization. The new couplings, which will permit operating pressures of mechanical lubricating systems to be stepped up to their maximum, are now being made available to service stations, which can change over to the new hydraulic system by attaching inexpensive adapter fittings to their present equipment.

When the operator pushes the connection against the ball-tip fitting, the three gripping jaws are forced in against the pressure of the stiff spring; the extra clearance in the outer housing then allows the jaws to expand, and the spring forces them forward to clip over the ball tip. The close-fitting piston is pushed forward, pressing the ends of the jaw members against the tapered inner wall of the housing, so that they are forced to close firmly around the ball tip. The pressure forces the hollow spherical end of the piston to seat against the ball tip, forming a grease-tight seal. The higher the pressure, the tighter are the grip and the seal.

PLAINTIFF'S EXHIBIT 52-K.

ALEMITE HYDRAULIC FITTINGS

The new Alemite Hydraulic Lubricating System recently introduced, and already adopted by Ford, Chevrolet, Pontiac, Oldsmobile and Nash, embodies a new principle in application of lubricant through fittings by pressure. New fitting and coupling design not only retains all the quick action of the Alemite push-type system, but also effects between coupling and fitting the most perfect seal yet achieved, it is said.

The seal is so positive that no manual pressure is needed to hold coupling onto fitting. As pressure generated by gun increases, strength of coupling's grip is increased; in other words, the greater the pressure, the tighter the seal. No lubricant leakage occurs during operation. Coupling is easily removed by a slight twist from fitting after bearing is lubricated. There are a number of hydraulic hand-service guns for use on new system, as well as a hydraulic adapter usable with power equipment. There also are adapters to convert specialized guns to this new system.

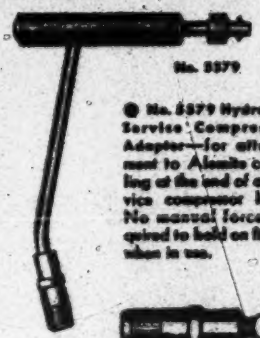
PLAINTIFF'S EXHIBIT 52-L.

ADAPT YOUR EQUIPMENT TO THE

ALEMITE

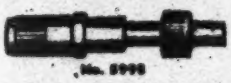
Hydraulic System with Three Adapters

● You doubtless know of the new Alemite Hydraulic System. It consists of a newly designed fitting with a ball top. Over this the jaws of the new couplers snap, making a tight seal as long as pressure is applied—releasing instantly as pressure is released. This system is now standard Equipment on the new Chevrolet, Ford, Oldsmobile, Pontiac and Nash. Other makes are considering immediate adoption. Alemite now offers a complete assortment of adapters made to fit every type of Alemite Gun. There are 12 different types of which a few are here shown.

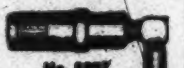


No. 5579

● No. 5579 Hydraulic Service Compressor Adapter—for attachment to Alemite coupling at the end of a service compressor hose. No manual force required to hold on fitting when in use.



No. 5998



No. 5997

● No. 5997 and 5998 Hydraulic Adapters with Lock Fittings—for attachment to Alemite couplings of service compressor hose or specialized lubrication hose.

6030 Series 6030 Series

6030 Series—identical to 6030 Series except that it has a 1½" pipe extension.

THESE NEW HYDRAULIC ADAPTERS AVAILABLE AT YOUR JOBBER'S. OTHERWISE WRITE ALEMITE DIRECT!

ALEMITE CORPORATION (Division of Stewart-Warner) 766
1866 Diversey Parkway, Chicago, Illinois
Please send full information on your new Hydraulic Adapter.

Name _____

Address _____

PIONEERS IN SPECIALIZED LUBRICATION

SEPTEMBER, 1933

AUTOMOTIVE MERCHANDISING - September, 1933

PLAINTIFF'S EXHIBIT 52-M.

Automotive Journal
Motor Row and
Garage Dealer
August, 1933

Alemite Hydraulic Connection

Alemite Corporation
1826 Diversey Pkwy., Chicago, Ill.

Pressures exceeding 10,000 lbs. per square inch without leakage may be obtained with a hand operated grease gun incorporating this

new hydraulic connection. These new couplings which will permit operating pressures of mechanical lubricating systems to be stepped up to their maximum are now being made available to service stations which can change over to the new system by attaching inexpensive adapter fittings. The higher the pressure the tighter the seal. That, in brief, is the distinctive feature of the new couplings. It is a distinctive improvement over those fittings which have been offered in the past.

Plaintiff's Exhibit 52-O

Alemite's Best Wishes

TO CHRYSLER

on its "Century of Progress in 10 Years!"

NO organization in the automotive industry is so closely allied with *all* car builders as Alemite. For Alemite High Pressure Lubrication Systems are a part of 99% of American-built cars.

It is, therefore, a matter of family pride for Alemite to congratulate such leaders as Chrysler upon their great achievements.

Alemite, too, has had its "century of progress" during the past 10 years. During this period it has been Alemite's pleasure to keep abreast with the rapid development of the modern car by developing soundly engineered lubricants to meet the increasing lubrication demands of higher speeds, closer precision limits and more intricate design.

A Revolutionary Achievement

The new Alemite Hydraulic Lubrication System, described below, has been hailed by automotive engineers as the greatest advance in lubrication since the original Alemite System. Proof of its revolutionary advancement lies in the fact that Chrysler and all other outstanding leaders of motordom have universally adopted it as standard equipment on their 1934 models!

SINCERE CONGRATULATIONS ALSO THAT EVERY CHRYSLER-BUILT CAR FOR 1934 HAS STANDARDIZED ON THE NEW ALEMITE HYDRAULIC LUBRICATION SYSTEM!

The Basic Principle of Alemite's New Hydraulic Lubrication System!

This new system embodies a new principle of applying lubricant through new fittings. It cuts time, labor and lubricant required to service bearings and assures positive lubrication under any and all conditions.

A coupling of entirely new design is used in connection with a new-style fitting or nipple to effect the most perfect seal which has ever been possible. This coupling actually grips the fitting so quickly that contact between gun and any fitting is established instantly.

The coupling STAYS LOCKED on the fitting—cannot slip off—so long as pressure is being applied. As pressure is increased, the grip of the coupling increases—in other words, "the greater the pressure, the tighter the seal."

With a regular Alemite Hand Gun and this system it is easily possible to build up a pressure of 6,000 pounds per square inch.

Like former Alemite systems, the new Alemite Hydraulic comprises fittings of all necessary angles and sizes, hand guns and adapters for power-operated equipment.

ALEMITE CORPORATION — STEWART-WARNER CORPORATION

1850 Diversey Parkway, Chicago

Plaintiff's Exhibit 52N

Sincerest Good Wishes

TO GENERAL MOTORS

on its 25 Years of Achievement

And Hearty Congratulations that Every General Motors Car for 1934 Has Adopted

THE NEW ALEMITE HYDRAULIC LUBRICATION SYSTEM!

ALTHOUGH Alemite Corporation does not date back to the inception of General Motors, 25 years ago, it is a matter of great pride and satisfaction to Alemite that its 12 years of sensational expansion closely parallels that of such great automotive leaders.

Had it not been for the confidence of the automotive industry, Alemite's outstanding success would not have been possible. And, it may be safely said, had it not been for the Alemite High Pressure Lubrication System, many outstanding advancements in motor car design and performance would not have been possible.

Pioneer of Modern Lubrication!

The beginning of modern lubrication was founded upon the Alemite High Pressure Lubrication System. The entire development of the Specialized Lubrication business followed this change from old-type to modern lubrication.

Alemite went forward with giant strides. When it designed its own special lubricants for each special automotive need, further impetus followed. Now, for years, it has enjoyed a complete, national acceptance in the minds of motorists, comparable with none other.

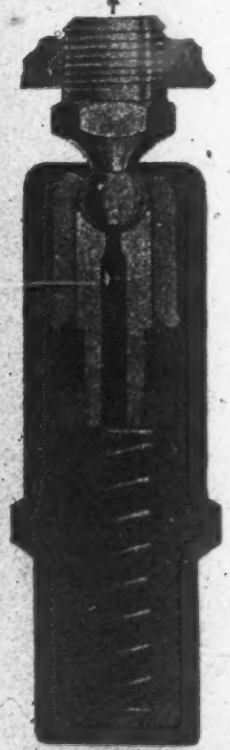
Alemite's sensational growth is logically traced to; 1. Quality Products. 2. Consistent Advertising, and 3. Sound Merchandising. Alemite's Distributor and Dealer Organization is said by experts to be a model of co-operative endeavor.

Now a New and Sensationally Better System!

The new Alemite Hydraulic Lubricatio System, described elsewhere on this pag has been hailed by automotive engineers a the greatest advance in lubrication since the original Alemite System. Proof of its remarkable capabilities lies in the fact that General Motors and all the other outstanding leader of motordom have universally adopted it a standard equipment on their 1934 models

Alemite Specialized Lubricants have als advanced to meet the increasing lubricatio needs of the modern car. In fact, ever step forward in design has found Alemit working hand in hand with the automotiv designing engineers responsible for its d velopment—to solve its lubrication pro lem *before* it was placed in the hands of t motoring public!

TO BEARING



The Basic Principle of Alemite's New Hydraulic Lubrication System!

This new system embodies a new principle of applying lubricant through pure hydraulic pressure. In each shock, lubricant is forced through pure hydraulic pressure. In each shock, lubricant and lubricant required to survive heavy-load tasks and assure positive lubrication under any and all conditions.

A coupling of entirely new design is used in combination with a new-style fitting or nipple to effect the most perfect seal which has ever been possible. This coupling instantly grips the fitting as quickly that contact between gun and any fitting is established instantly.

The coupling STAYS LOCKED on the fitting—cannot slip off—no matter how great pressure is being applied. As pressure is increased, the grip of the coupling increases—in other words, the greater the pressure, the tighter the seal.

With a regular Alemite Hand Gun and this system it is easily possible to build up a pressure of 5,000 pounds per square inch.

Any former Alemite system, the new Alemite [illegible] of all necessary seals

Stewart-Warner Corporation Continues Equipment Leadersh

Stewart-Warner's more than 25 years of leadership in the automotive equipment i also parallels the growth of this gigantic industry.... Today, with even greater vigor than ev before, it is advancing to new heights through the sale of Speedometers, Instrument Pum Fuel Pumps, Power Brakes, and other automobile accessories and precision instruments. . Stewart-Warner adds to Alemite's salute to General Motors on the occasion of its 25th Jubil

ALEMITE CORPORATION—STEWART-WARNER CORPORATIO
1929 Diversey Parkway, Chicago

Here is the industry's quality Grease Gun and Quality Tire Pump

The Acme Grease Gun is a quality product in every sense of the word. Soundly engineered and carefully manufactured this grease gun is in a class by itself. New features and unusual refinements. You should have the full details of this quality "gun."

The Acme Tire Pump is of equal quality. Precisely designed—precisely manufactured. Above all, this pump is absolutely dependable.

These two products are giving unusual satisfaction in all parts of the country.

Write for full details and specifications.

MANUFACTURERS OF

Tubular Products **Automotive Parts**
Mechanical Tubing **Special Shapes**

MILLER-SHELBY PRODUCTS DIVISION OF

MICHIGAN STEEL TUBE PRODUCTS CO.

Detroit, Michigan

516 PLAINTIFF'S EXHIBIT 53.

(Letterhead of Lincoln Engineering Company, St. Louis.)

February 21, 1933.

Mr. J. E. Otis, Jr.,
Vice President,
Alemite Corporation,
2650 N. Crawford Ave.,
Chicago, Ill.

Dear Mr. Otis:

Our two recent talks in St. Louis and Chicago leave me still of the opinion that our company must proceed with its own direct sales plans. This is not a sudden decision, but one reached as a sequel to many changes which have taken place since our earlier associations with your company. We feel that these changes are of a fundamental nature which would properly subject us to the criticism of using poor business judgment if we were to continue to entrust the major portion of our sales exclusively to an outlet over which we have no control, even though of great sales ability and occupying a prominent position in the industry. Some of the changes are:

1. You have entered into direct competition with us, partially through the purchase of similar equipment from other sources and partially through direct manufacture. We cannot foretell how extensive this competition will become.
2. You have fostered indirect competition with us by licensing all other important manufacturers of lubricating equipment without offering any compensating privileges to us.
3. You have asked us to refrain from contacting your distributors for the purpose of servicing our equipment, and have excluded us from your sales conventions.
4. You have increased prices on some of our compressors coincident with the introduction of competitive equipment which in our opinion was unjustifiably detrimental to our interests.
5. You are not now placing any production orders with us, commensurate with the manufacturing and buying orders which we must place to protect our prices to you, thereby

transferring all inventory risks to us in the face of greatly diminished sales.

517 We do not attempt to judge the merits of these changes from your point of view. We point them out merely to indicate why we do not consider it sound business to continue indefinitely to sell exclusively through a company which has become increasingly a competitor and which may, at its own discretion, and without notice, become 100% so.

You have now asked that we consider the manufacture of compressors of your design, to replace those of our design. This would in a short time obscure any good will which we have established as designers and manufacturers of Lincoln equipment, and would, with the approaching expiration of certain patents, leave us in poor strategic position to meet open competition that is almost certain to spring up at that time. For this reason we do not deem it advisable to give up manufacturing our own patented products.

We have no desire whatever to discontinue the sale of our products through your company, and would be reluctant to see this come about through any act of ours. On the other hand we would like to suggest a constructive plan which we believe would lead to close operation between our companies somewhat as follows:

1. We will agree to supply you with any equipment of our manufacture now listed in your catalog or sales literature on the present price basis, or at 60% off our established list prices, or at a discount 10% greater than our established distributors' discount, whichever is lowest.

2. We will agree to supply you with any other automotive equipment of our manufacture, or exclusive sales rights, at 60% off our established list prices, or at a discount 10% greater than our established distributors' discount, whichever is lower. (There would be a few exceptions to be arrived at by agreement, such as Display Stands.)

3. You will agree to supply us with any equipment of your manufacture or exclusive sales rights at your established distributors' discount, or 50% off your established list prices, whichever is lower. (There would be a few exceptions as in Paragraph 2.)

4. We will mutually agree to maintain the schedule of selling prices established by the manufacturer of the equipment.

518 5. We will mutually agree to a suitable discount adjustment clause against the contingency of outside price competition which might render the above discounts untenable.

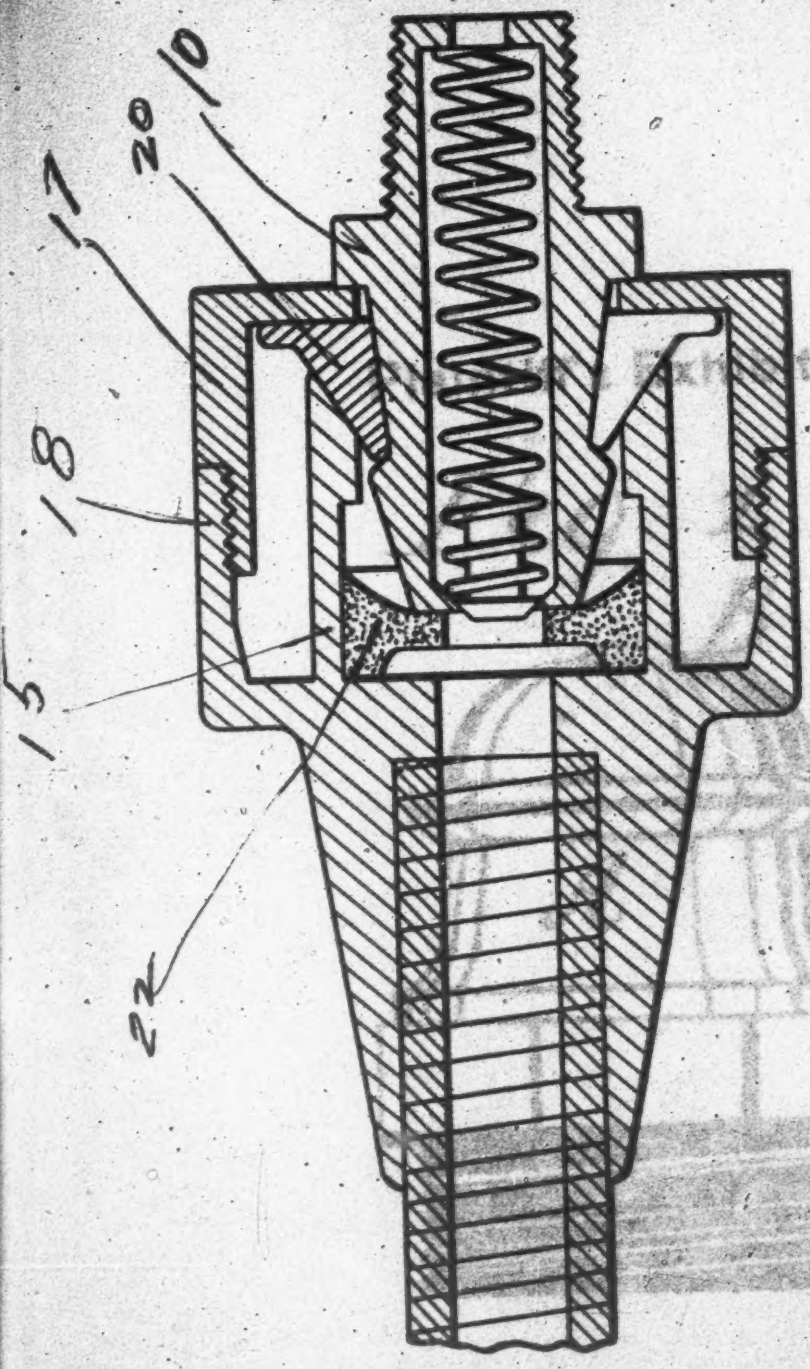
6. We will mutually agree to a suitable cancellation clause.

You have expressed the opinion, in which we concur, that the talents of both organizations for the design and manufacture of equipment should be capitalized. We believe this is best accomplished by neither company forcing its ideas on the other, but by making them mutually available. With such an arrangement in effect we feel that any increase in sales by either company would come from sources not now buying from the other, or in other words at the expense of outside competitors.

We sincerely hope you will give thoughful consideration to these suggestions.

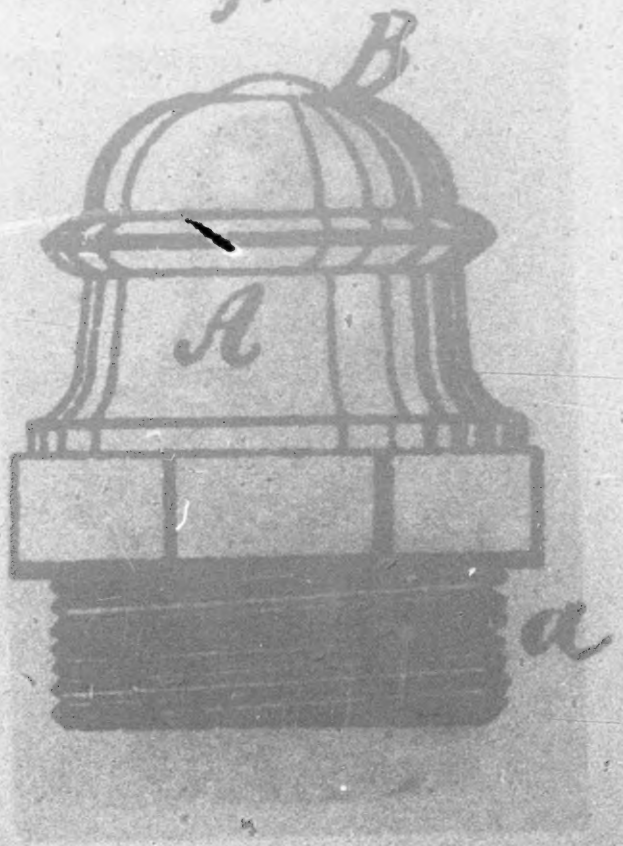
Very truly yours,
Frank S. Barks,
President,
Lincoln Engineering Company.

Plaintiff's Exhibit 55

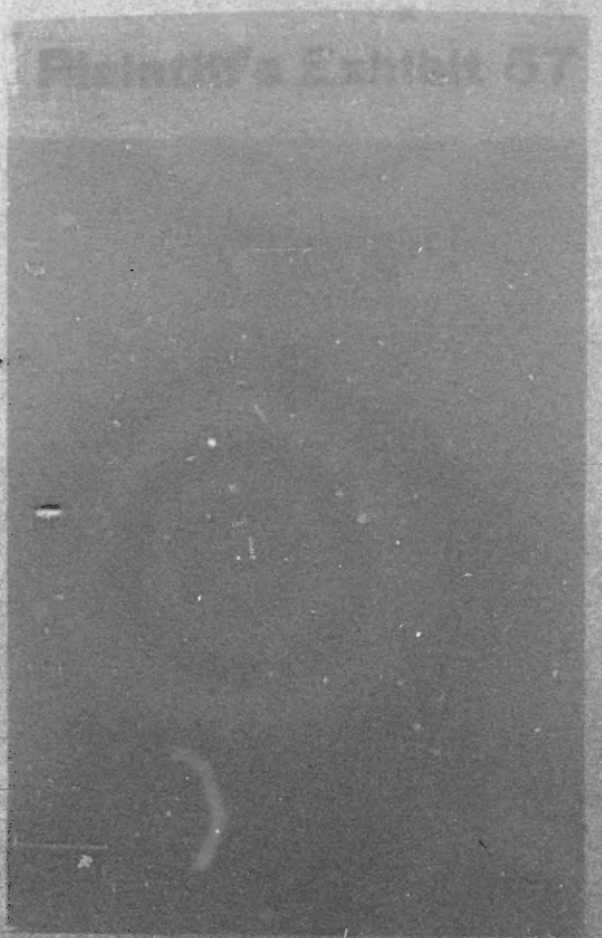


Plaintiff's Exhibit 56

Fig. 1



Plaintiff's Exhibit 56



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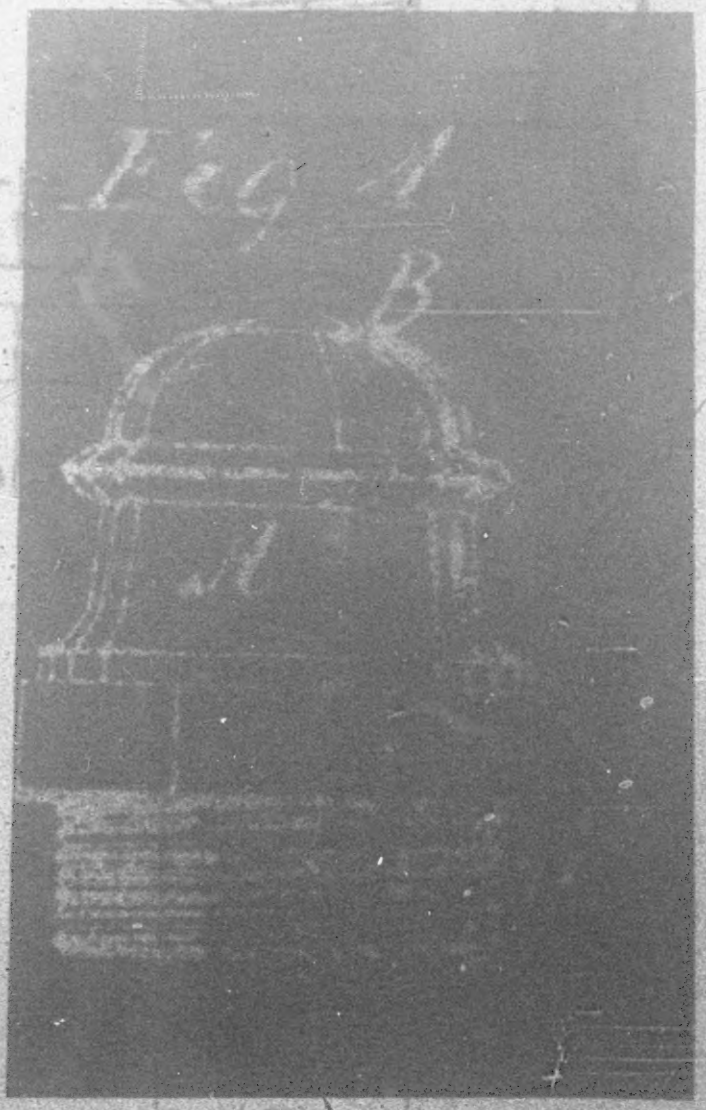
Plaintiff's Exhibit 89

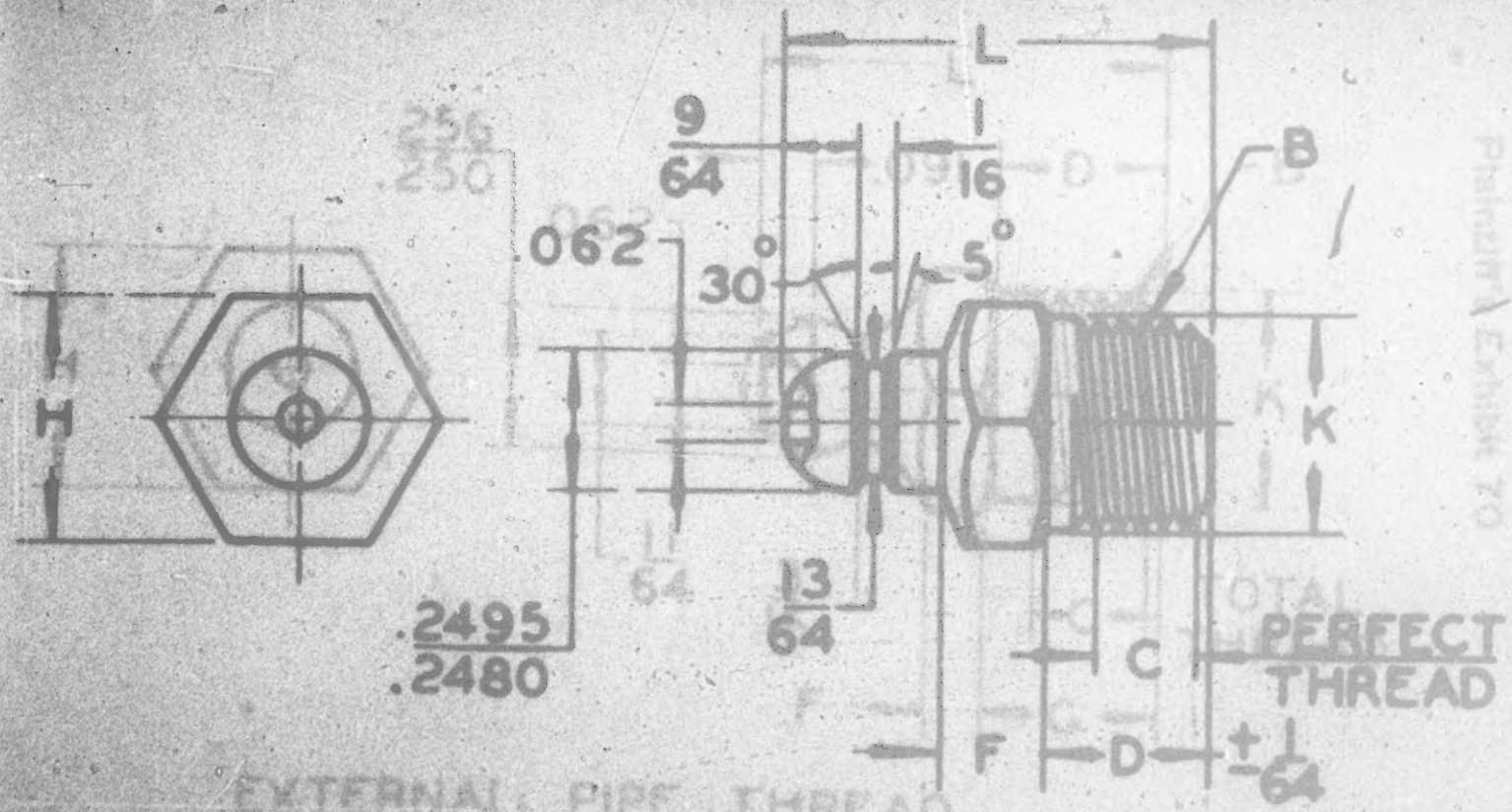
Plaintiff's Exhibit 58



PERFECT THREAD

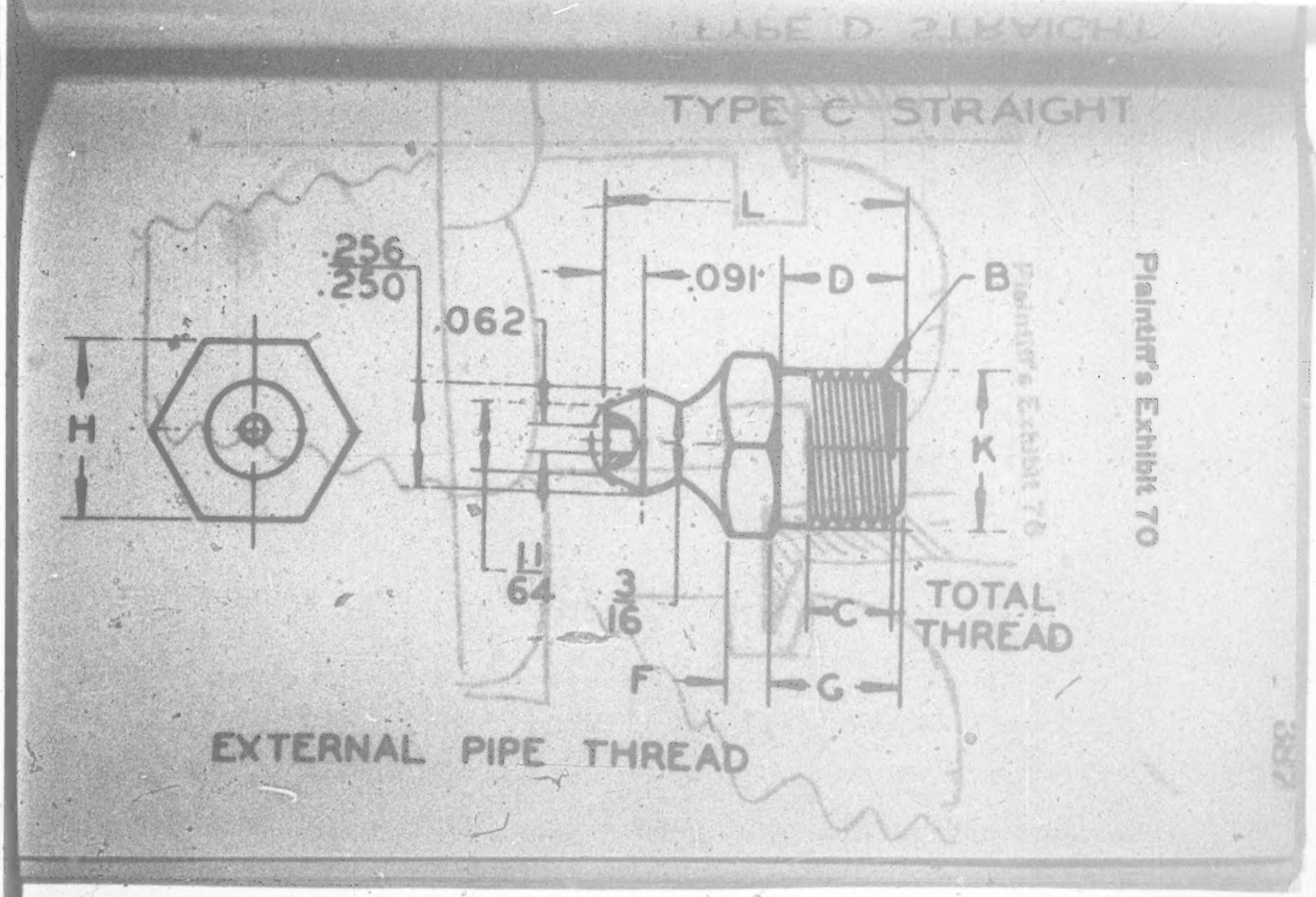
EXTERNAL PIPE THREAD

TYPE D STRAIGHT



EXTERNAL PIPE THREAD

Plaintiff's Exhibit 69


TYPE C STRAIGHT
L
.256
.250
.062
.091
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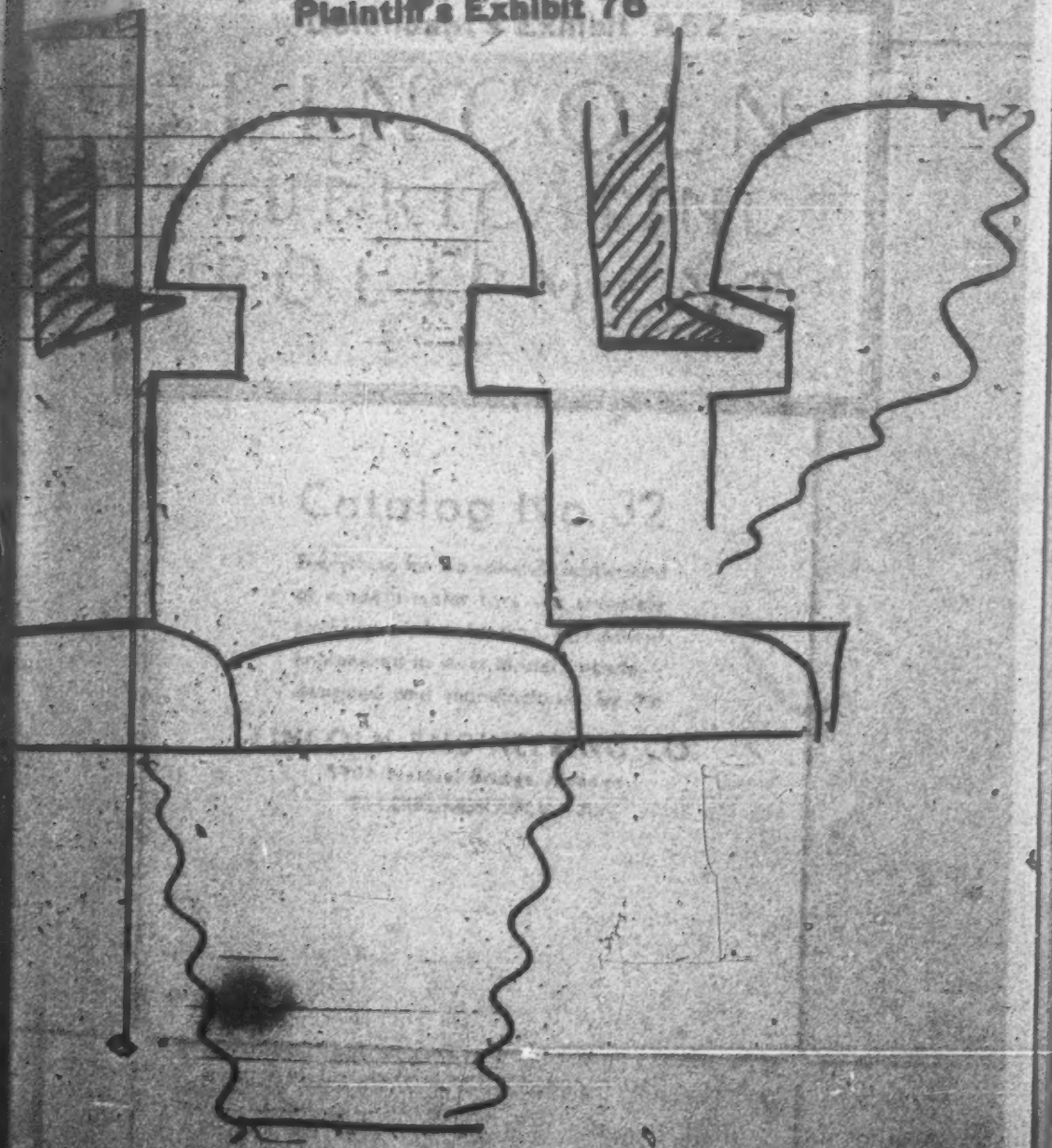
K
11/64
3/16
C
TOTAL THREAD
F
G
EXTERNAL PIPE THREAD
Plaintiff's Exhibit 70

Plaintiff's Exhibit 76



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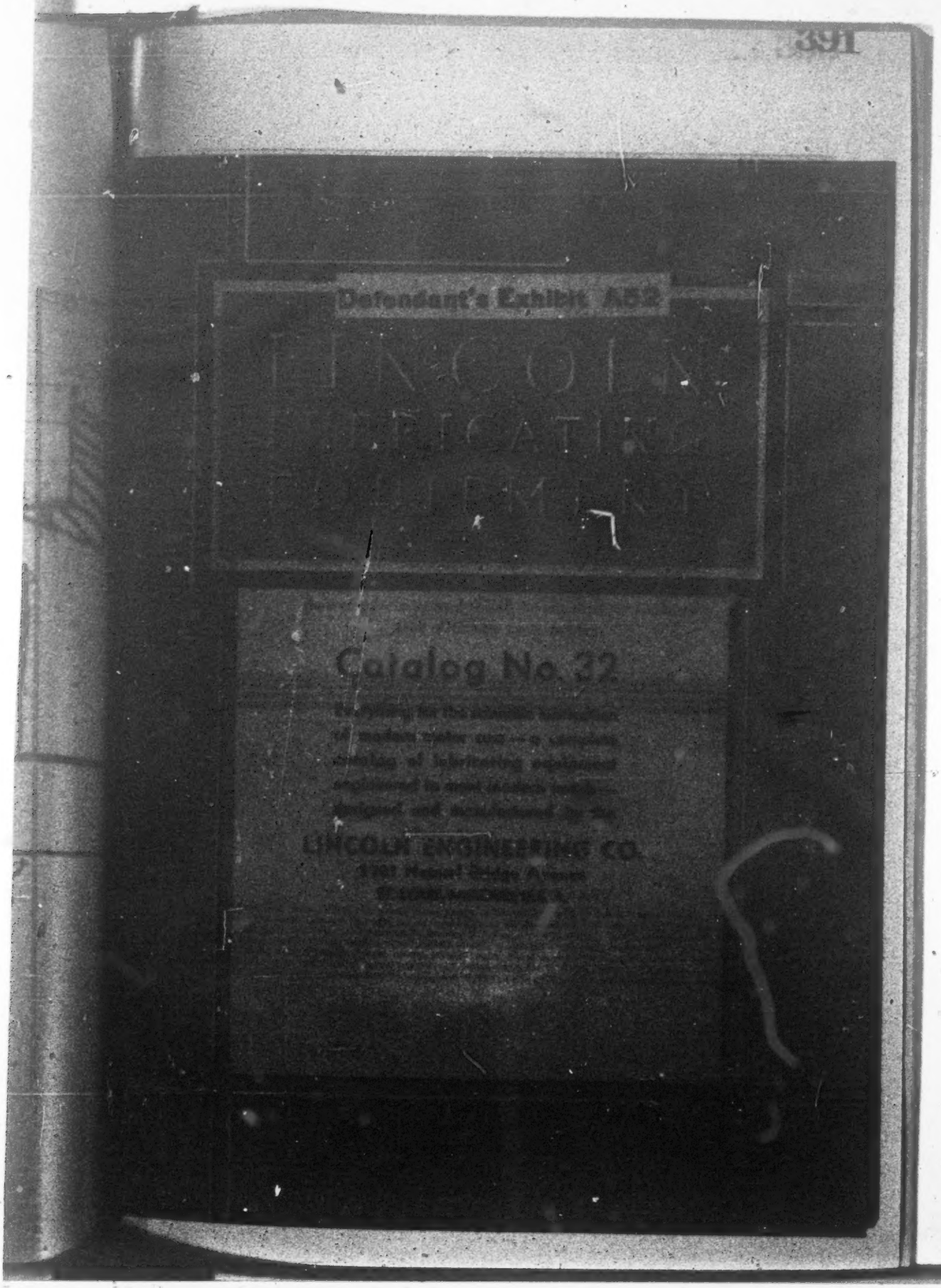

Defendant's Exhibit A52
LINCOLN
Catalog No. 32
LINCOLN ENGINEERING CO.

LINCOLN ENGINEERING CO., ST. LOUIS, MO.

SERVICE WARRANTY

Any Lincoln Lubricating Equipment, either complete Lincoln units or accessories when used only with such units, that develops defects in the ordinary course of service for which it was sold may be returned transportation charges prepaid, to the factory at Saint Louis, Missouri, by the original purchaser, his distributors, dealers, or agents, within six months from date of purchase, and it will be repaired or replaced free of charge f.o.b. factory.

PATENTS . . . TRADEMARKS

AIRLINE and ELECTRIC LUBRIDUNS, General Valves, Nozzles, LUBMOBILES, Pumps, Dispensers, FLEX-O-MATIC Couplers and Valves FLEX-O-MATIC Systems and other lubricating and associated equipment manufactured and sold by the Lincoln Engineering Company are patented by our Patents and Trade Mark Registrations, including U. S. Patents [illegible] Design patents [illegible] and [illegible]; Canadian patents [illegible]; U. S. Trade Mark Registrations [illegible]; Canadian Trade Mark Registrations [illegible] and by pending applications for Patents and Trade Mark Registrations.

LINCOLN ENGINEERED LUBRICATION

Defendant's Exhibit A53

Bulletin 111

LINCOLN *Kleenseal Lubrication* SYSTEM

The Lincoln KLEENSEAL Lubrication System includes a full line of KLEENSEAL FITTINGS for attaching to the bearings to be lubricated, and a wide range of guns equipped with KLEENSEAL Nozzles for contacting the fittings. The KLEENSEAL System offers a complete and economical method for lubricating a great number of different types of equipment, such as:

Automobiles	Conveyors	Looms
Industrial Trucks	Plant Equipment	Pumps
Trucks	Road Machinery	Laundry Machinery
Farm Machinery	Overhead Trolleys	Cranes
Motor Boats	Hoists	Cotton Gins
Presses	Crushers	Tractors

The KLEENSEAL System is fast, clean, economical and efficient. It saves time, labor, lubricants and money.

We recommend that only Lincoln KLEENSEAL Nozzles be used to contact Lincoln KLEENSEAL Fittings. The use of other nozzles, and particularly grip jaw types, may result in damage to the fittings.

The Lincoln KLEENSEAL Lubrication System is protected by U. S. Patents 1947308, 1959517, 1959529, 2010174, and by Canadian Industrial Designs Registered, 1935. Other U. S. and foreign patents pending.

LINCOLN ENGINEERING CO.
General Offices: 5701 Natural Bridge Avenue, ST. LOUIS, MO.
Factories: ST. LOUIS, MO. DETROIT, MICH.

LINCOLN KLEENSEAL FITTINGS

Lincoln KLEENSEAL Fittings for lubrication are making important advances everywhere because they represent a long step forward in lubrication engineering. More and more manufacturers of automobiles, trucks, buses and farm implements are adopting Lincoln KLEENSEAL Fittings as original equipment. There are several reasons for this preference:

1. CLEAN lubrication due to internal nozzle contact and positive seal.

2. FAST lubrication because a quick, positive-seal contact is possible. Construction of fittings allows nozzle to be used at an angle.

U. S. patents 1947208, 1998517, 1998520, 1999124. Canadian Industrial Design Registered, 1935. Other U. S. and foreign patents pending.

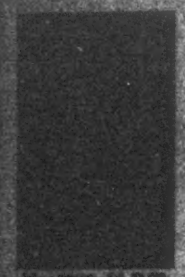
3. EFFORTLESS lubrication because full lubricant pressures are effectively used, due to small area of contact. A moderate push will hold pressures up to 10,000 lbs.

4. DAMAGE FREE owing to ball-to-cavity contact and round design of head.

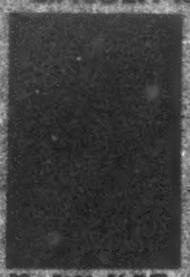
5. SELF-CLEANING when the nozzle nozzle enters the fitting the dirt is parted.

6. Fittings are HARDENED to give long service.

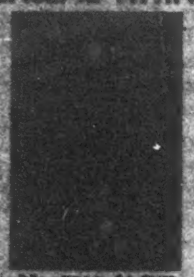
LINCOLN KLEENSEAL FITTINGS ON CARDS



No. 5100, ⅛ P.T.
90 Degree Elbow
Price each.....15c
10 on card, weight 4 oz.
10 cards in box.
Weight 2½ lbs.

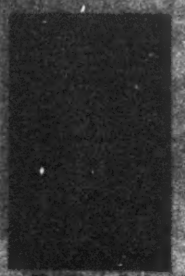


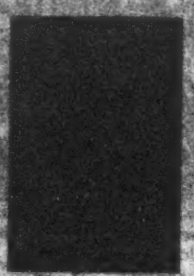
No. 5300, ⅛ P.T.
45½ Degree Elbow
Price each.....15c
10 on card, weight 4 oz.
10 cards in box.
Weight 2½ lbs.



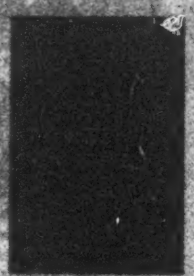
No. 5400, ⅛ P.T.
90 Degree Elbow
Price each.....15c
10 on card, weight 4 oz.
10 cards in box.
Weight 2¼ lbs.

No. 5500, ⅛ P.T.
Water Pump with cap.
Price each.....25c
10 on card, weight 6 oz.
10 cards in box.
Weight 3½ lbs.
No. 5560, Cap only, each 10c



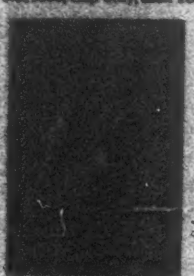


No. 5130, ¼"
Price each.....12c
10 on card, weight 3 oz.
10 cards in box.
Weight 1¾ lbs.



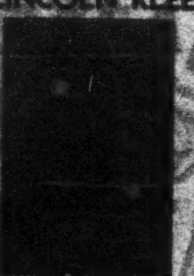
No. 5010, ⅛"
28 Thread, Button Head, Short Thread.
Price each.....10c
10 on card, weight 1¾ oz.
10 cards in box.
Weight 12 oz.

No. 5210, ¼"
28 Thread, 45 Degree Elbow, Short Thread.
Price each.....15c
10 on card, weight 2 oz.
10 cards in box.
Weight 1¼ lbs.



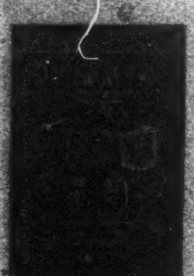
No. 5212, ¼"
28 Thread, 45 Degree Elbow, Long Thread.
Price each.....15c
10 on card, weight 3 oz.
10 cards in box.
Weight 1¾ lbs.

LINCOLN KLEENSEAL FITTINGS NOT ON CARDS

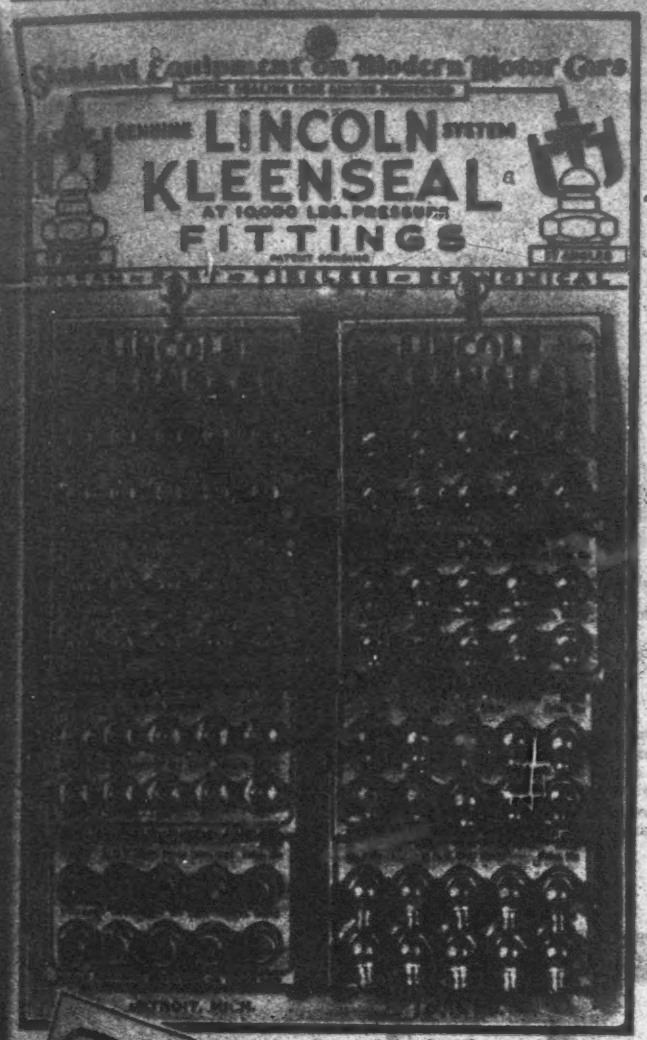


No. 5013, ⅛"
28 Thd., Straight, Long Thd.
Price each.....10c
50 in package, weight 8 oz.

No. 5204, ¼ P.T.
45¼ Elbow, with ball seat.
Price each.....25c
50 in package, weight 1 lb.



No. 5080, ⅛ P.T.
Straight
Price each.....20c
50 in package, weight 1¾ lbs.



Lincoln Kleenseal Fitting
Display Assortment No. 5598
Price $11.00

LINCOLN KLEENSEAL FITTINGS DISPLAY

Assortment No. 5598

This display card for Lincoln KLEENSEAL Fittings carries 8 smaller cards, one each for the most popular types of fittings. It makes selling easy.

The 8 smaller cards are suspended from the big card on strongly attached hooks. Each small card carries TEN FITTINGS. These fittings are forced into holes in the small cards and can easily be detached by unscrewing them.

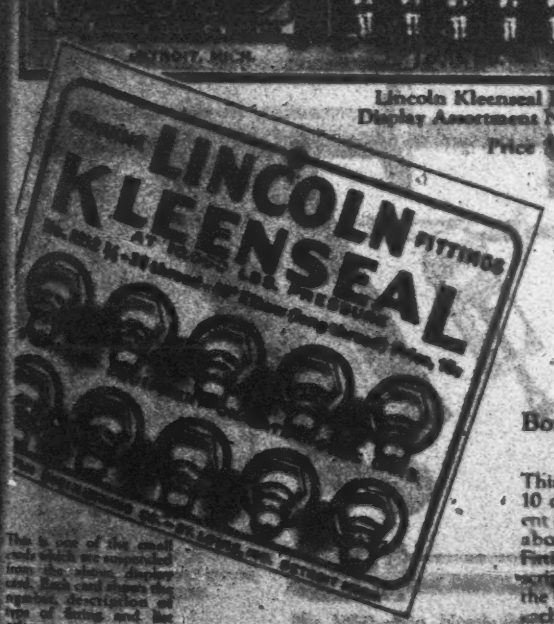
The display card of 8 cards of fittings can either be hung up — an eyelet is provided — or it can be stood up on a counter, being provided with an easel.

Displaying this card of fittings, on wall or counter, instantly suggests a sale to the motorist. At the same time the jobber's salesman can note which card is practically out of fittings and can replace it. This saves time and avoids forgetting to order replacements. The card, in orange and black, has high visibility.

Following fittings included on display card No. 5598.

10 — No. 5030 — ⅛" Drive, Straight.
10 — No. 5010 — ¼" 28 thread Straight, short thread.
10 — No. 5000 — ⅛ P.T. Straight.
10 — No. 5500 — ⅛ P.T. Water Pump with cap.
10 — No. 5130 — ⅛" Drive, 30 degree angle.
10 — No. 5212 — ¼" 28 thread, 45 degree angle.
10 — No. 5100 — ⅛ P.T. 30 degree angle.
10 — No. 5300 — ¼" P.T. 67½ degree angle.

Shipping Weight, 2 lbs. 10 ozs.



Box of 10 Cards of Fittings

This package contains 10 of any of the different cards shown on the above Display card. Fitting number and description stamped on the box. 100 fittings in each box.

LINCOLN BUSINESS BUILDING LUBRICATION EQUIPMENT

LINCOLN KLEENSEAL GREASE GUNS

Many owners lubricate their own cars, trucks, farm machinery, tractors, motor boats and a wide variety of machinery and equipment.

Kleenseal Grease Guns, in seven models, are designed to provide a better and more satisfactory service that ever has been available before. They are correctly engineered to handle the lubricants designated. Can be operated with one hand. Capable of developing extremely high pressures where required.

Equipped with Kleenseal nozzles to contact Lincoln Kleenseal fittings. The four guns shown provide a complete lubricating outfit.

No. 1 (Model 5921)
For Pressure Gun Grease —CHASSIS 3-oz. capacity.
Price $1.50

This CHASSIS gun develops extremely high pressures. The plunger is vacuum primed. Sectional view at right shows how lubricant is fed to the high pressure chamber of the pump. Capacity 3 ozs. Weight 10 ozs.

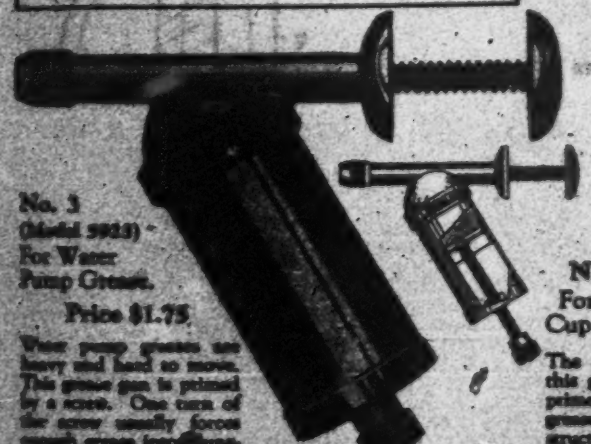
No. 6 (Model 5926)
For Pressure Gun Grease. CHASSIS — Capacity 5-ozs.
Price $1.75

A grease gun for CHASSIS lubrication. Same gun as No. 1 only 5-oz. capacity. Sectional cut above shows construction. A very powerful grease gun. Capacity 5 ozs. Weight 12 ozs.

KLEENSEAL GUNS (Not Illustrated)

A complete line of medium pressure guns is available. They pump twice the volume at one-half the pressure.

No. 2—Model 5922—For Fluid lubricant and heavy oil	$1.65
No. 5—Model 5925—Same as No. 1, except volume—medium pressure type	$1.75
No. 4—Model 5924—Same as No. 7, except volume—medium pressure type	$2.00



No. 3 (Model 5923) For Water Pump Grease.
Price $1.75

Water pump greases are heavy and hard to move. This grease gun is primed by a screw. One turn of the screw usually forces enough grease into plunger to lubricate the water pump. Used also for wheel bearings. Action illustrated in small sectional cut at right. Weight 11 ozs.

No. 7 (Model 5927)
For Fibrous and Heavy Cup Greases. Price $2.00

The sectional view at right of this gun shows how the spring prime forces the follower to keep grease in the plunger. The construction is sturdy, operation easy. Weight 16 ozs.

No. 5890—6-in. Nozzle Extension for any of above guns—Price 50c

LINCOLN ENGINEERING CO., ST. LOUIS, MO.

Printed in U.S.A.

Defendant's Exhibit A76 Sheet 1

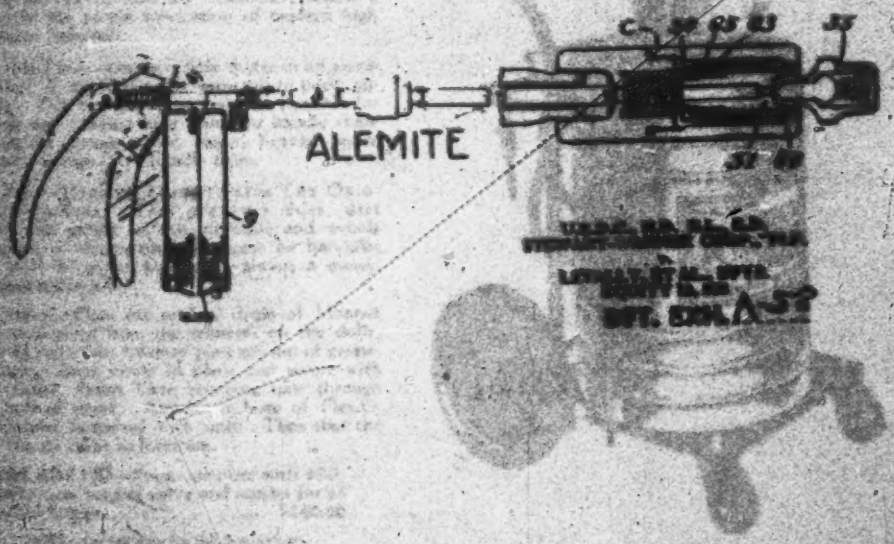
Lincoln Engineered Lubrication Equipment

Suitable for Dispensing

TEXACO MARFAK

Defendant's Exhibit A58

PLAINTIFF'S EXHIBIT NO. 35



Defendant's Exhibit A76 Sheet 1

Lincoln Engineered Lubrication Equipment

Suitable for Dispensing

TEXACO MARFAK

The NEW LINCOLN TWIN
CYLINDER AIRLINE LUBGUN

The Lincoln Twin was born of the need for a pump capable of handling the sticky, viscous lubricants, like the Texaco Marfaks. These have become a necessity for the proper lubrication of modern high speed motor vehicles.

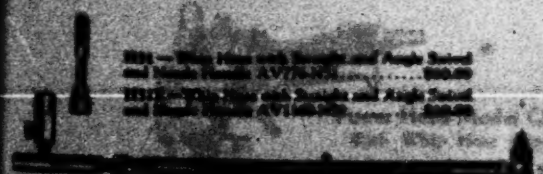
This little Twin does incredible things in an amazing fashion. It embodies a new principle in pump engineering. This new principle makes it possible for this small and compact little pump to handle these heavy viscous greases, when bigger, heavier, more cumbersome pumps can't handle them.

The Twin Operates Direct From The Original Containers. This prevents dust, dirt or sand from getting in the lubricant and avoids the necessity of transferring the grease by hand, or pushing into the grease container—always a messy, dirty, disagreeable job.

To Operate—Place the original drum of Marfak (freshly as received from the refinery) on the dolly. Remove lid and cover follower plate on top of grease. Place Lincoln drum cover in place and secure with the end clamps. Insert Twin's plunging tube through central hole of cover. Attach air hose of Flex-O-Matic Coupler furnished with unit. Then start the pump. You are ready to lubricate.

Model AB-135D—Price, complete with 10-ft. delivery hose, control valve and nozzles for all standard fittings.....$140.00

NOTE—See low page for full description of Lincoln Nozzles and their application.



The secret of the ability of the Twin to pump heavy viscous greases, like the Marfaks, is that it is composed of a plunger and a booster pump. You'll note in operating the Twin that one pump stroke makes one stroke while the other makes five or six. This slow pump priming and fills the plunging tube at one stroke, while the booster pump stroke five or six strokes to prime it. In this way the pump gives a continuous flow of grease, moving even the heavy sticky greases with ease.

Defendant's Exhibit A76 Sheet 3

Defendant's Exhibit A76 Sheet 2

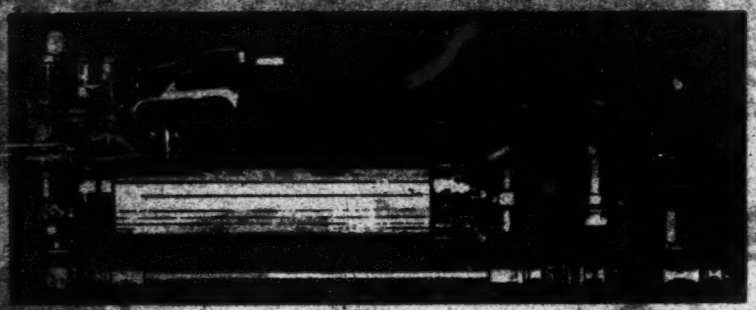
LINCOLN ENGINEERING CO., ST. LOUIS, MO.

LINCOLN ENGINEERING CO., ST. LOUIS, MO.

LINCOLN AIRLINE LUBRIGUNS—Model A-1

Model A1 Lincoln AIRLINE LUBRIGUNS are [illegible] and operated by [illegible] pressure [illegible]. Flow of lubricant is under [illegible] control and flows automatically while the trigger is [illegible]. The parts are air primed. They can be filled by hand or [illegible] from [illegible] by connecting a Lincoln Filler Pump.

Equipped with Lincoln Flex-O-Matic Coupler Nipple for quick [illegible] and [illegible]. Greater capacity approximately 1 lb. Designed to develop 7500 lubricant pressure at 150 lb. air pressure. Pump plunger, bushing and air valve cups of Microfluy steel. Pump and [illegible] gun for quick lubricating of motor cars.

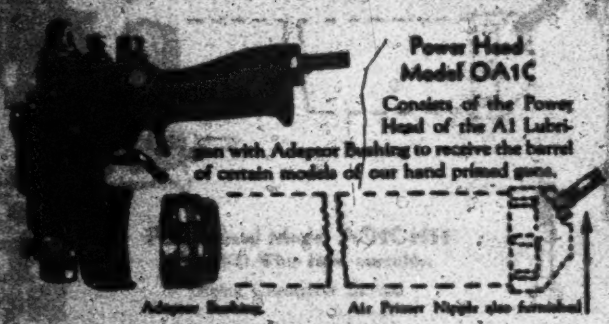


Model A1C-H51

For chassis lubricant—A powerful air operated hand gun, [illegible] and [illegible]. Equipped with 10-inch hose and LUBRIGUN Nozzle H51. Identification plate "CHASSIS LUBRICANT." Shipping Weight 9 lb.

Price $40.00

With Flex-O-Matic Coupler $41.50



Power Head Model OA1C

Consists of the Power Head of the A1 Lubrigun with Adaptor Bushing to receive the barrel of certain models of our hand primed guns.

Adaptor Bushing. Air Primer Nipple also furnished

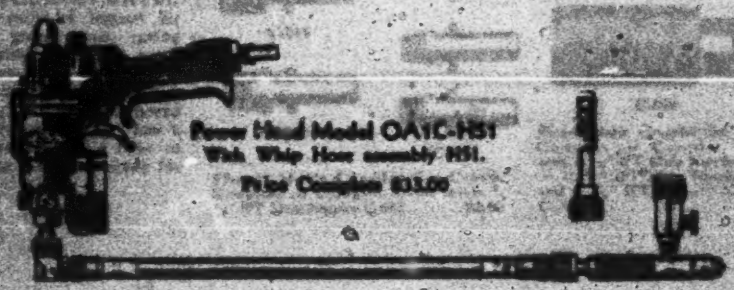
Price Complete $23.00

NOTE—In ordering Power Head always specify clearly make and model of hand gun with which it is to be used.

Power Head Model OA1C-E1

With Lubrigun Nozzle Extension E1.

Price $24.75



Power Head Model OA1C-H51

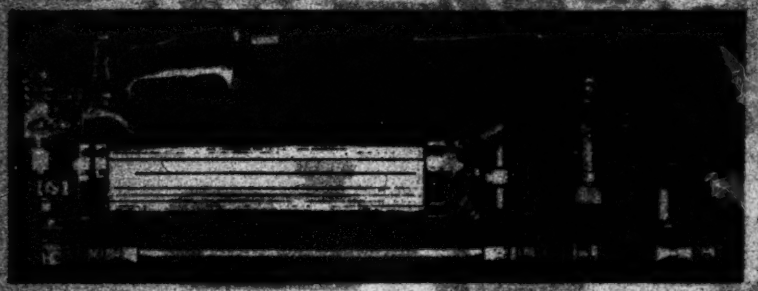
With Whip Hose assembly H51.

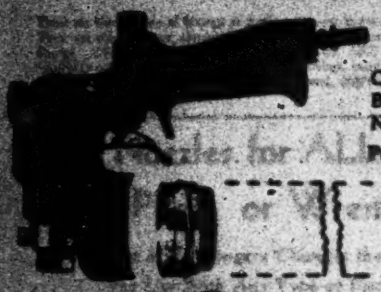
Price Complete $33.00

Defendant's Exhibit A76 Sheet 3

LINCOLN ENGINEERING CO., ST. LOUIS, MO.

LINCOLN AIRLINE LUBRIGUNS—Model A-2



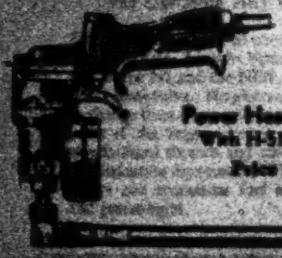


Power Head Model OA3C

Complete with Adapter Bushing and Air Prime Nipple.

Price Complete $17.00

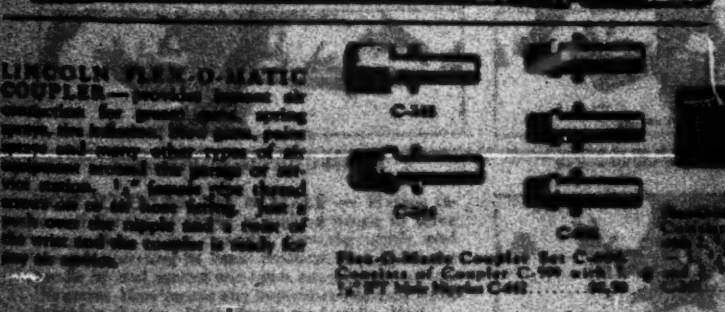
Power Head Model OA3CE1

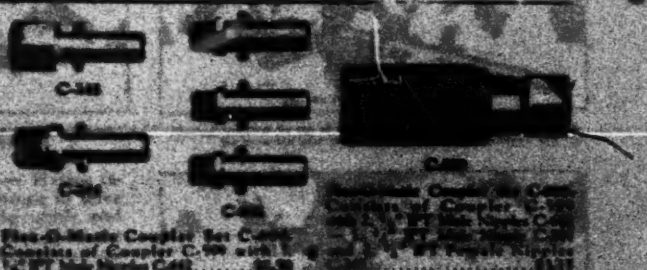


Power Head Model AO2C-H51

With H-51 Whip Hose assembly.

Price Complete $17.00





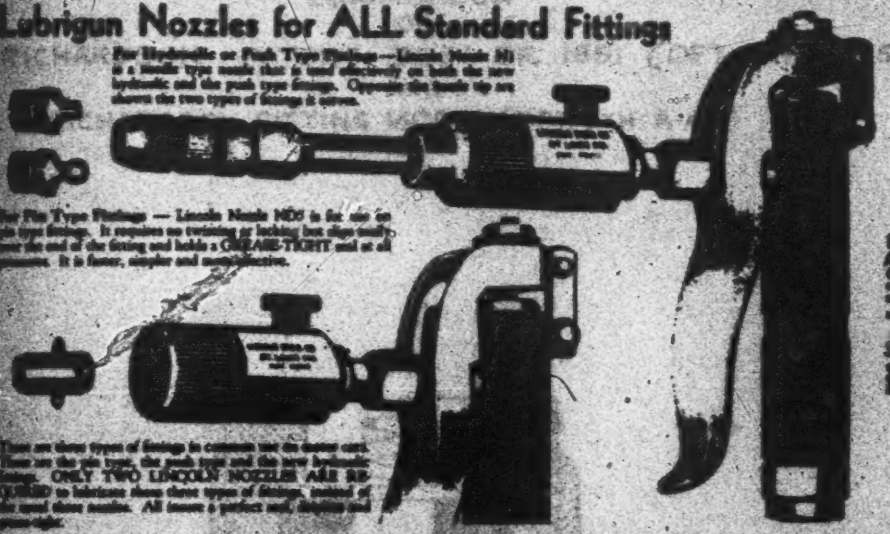
LINCOLN FLEX-O-MATIC COUPLER—

Defendant's Exhibit A76 Sheet 4

Defendant's Exhibit A76

LINCOLN ENGINEERING CO., ST. LOUIS, MO.

Lubrigun Nozzles for ALL Standard Fittings



For Hydraulic or Push Type Fittings—Lincoln Nozzle N1 is a needle type nozzle that is used effectively on both the new hydraulic and the push type fittings. Opposite the nozzle tip are shown the two types of fittings it serves.

For Pin Type Fittings — Lincoln Nozzle ND1 is for use on pin type fittings. It requires no twisting or locking but slips easily over the end of the fitting and holds a GREASE-TIGHT seal as all pressure. It is faster, simpler and more effective.

There are three types of fittings in common use the country over. These are the pin type, the push type and the new hydraulic fittings. ONLY TWO LINCOLN NOZZLES ARE REQUIRED to lubricate these three types of fittings, instead of the usual three nozzles. All insure a perfect seal, dirtless and grease-tight.

U.S.R.C. NO. ILL. E.D. STEWART-WARNER CORP., PLF. LOYALTY ET AL. DFTS. EQUITY NO. 963

Two Nozzles for ALL Fittings—Easily Changed by Hand

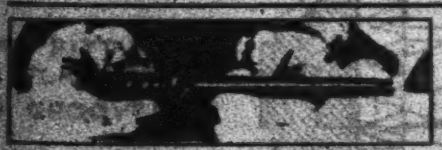
No Pliers or Wrenches

A Twist of the Fingers Changes the Nozzle For Use With Any Type of Fitting

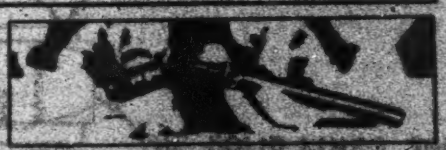
This is the easy way to connect all standard lubricating fittings. Lincoln Nozzle ND51 is a combination of the N1 and the ND1, and is shown here on the control valve. No pliers or wrenches are needed to change from one nozzle to the other. Just an easy twist of the fingers does it. Lincoln nozzles have standardized threads and can be used on any make of lubricating equipment. They are time and labor savers and economize fuel and oil. Bring dirtless and grease-tight.

Changing to ND51 to lubricate new push Pin Type Fittings

Changing to N1 with Lubrigun Straight Extension to service new push type Hydraulic or Push Type Fittings

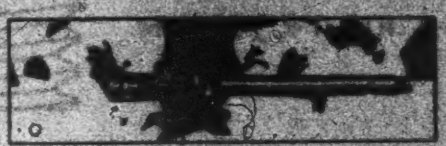


The N1 Nozzle is quickly screwed on with thumb and forefinger by twisting the tip back and forth with the fingers



Showing forward tip of N1 Nozzle unscrewed by twisting with fingers, ready to turn back for cleaning

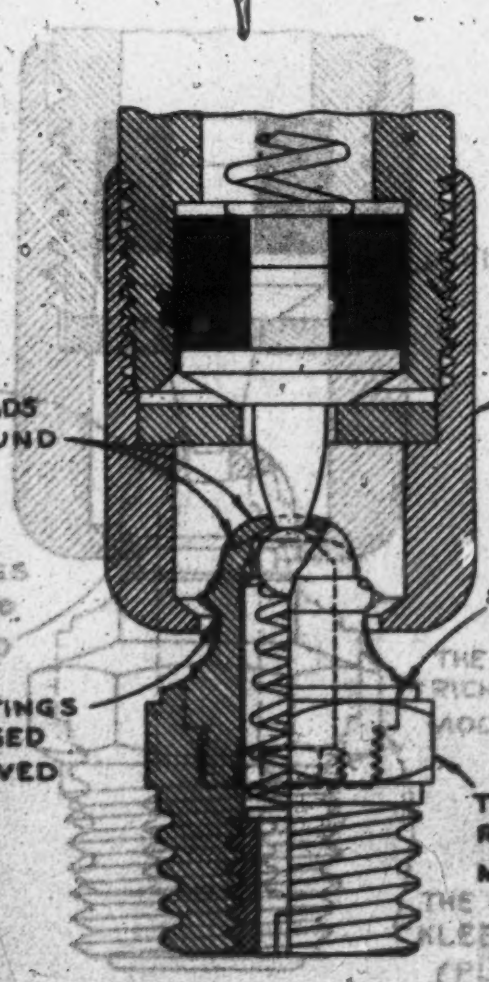
HOW TO CLEAN N-1 NOZZLE — Having removed the tip, as above, to make a nozzle to serve a pipe plug, or for cleaning, turn the nozzle end around, reversing its usual position, and place the nozzle tip end against the open nozzle and turn on the grease, blowing out any impurities that may have lodged in the tip. Very simple, and easily done.



For cleaning, remove nozzle tip as above

Defendant's Exhibit A78

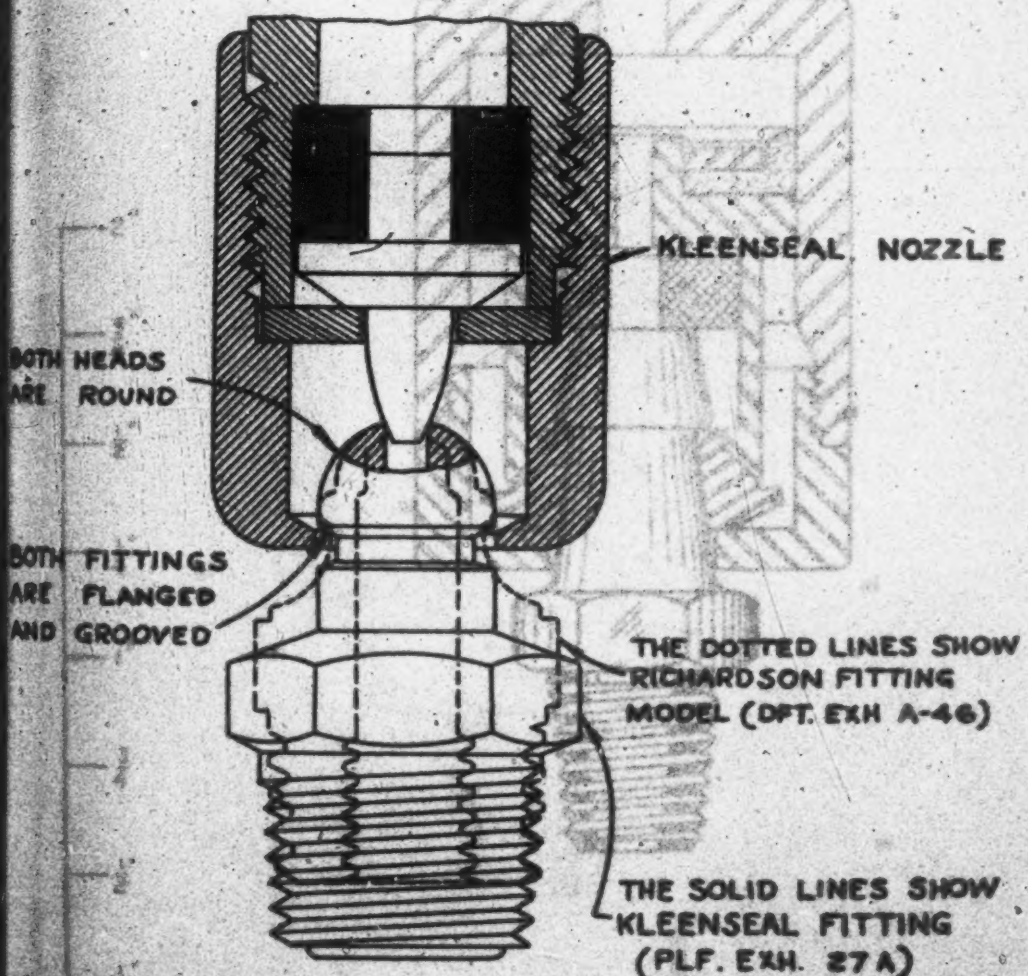
COMPARISON
OF
RICHARDSON PATENT 8251 OF. 1851 (DFT. EXH. A-45)
AND
RICHARDSON FITTING MODEL (DFT. EXH. A-46)



Defendant's Exhibit A80
DRAWING OF PLF
EXH. 62 AND 62A

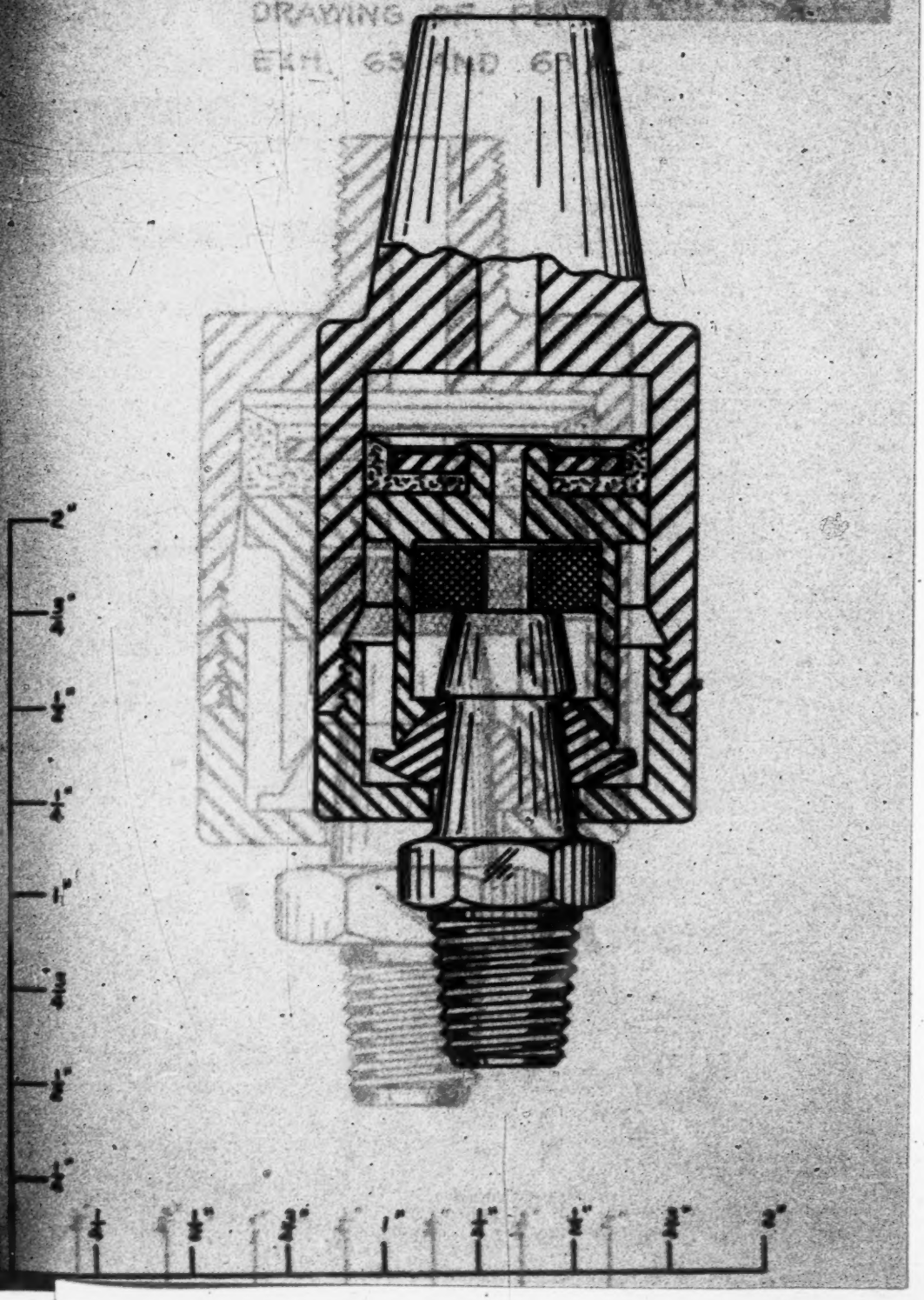
Defendant's Exhibit A79

COMPARISON OF
RICHARDSON FITTING, MODEL (DFT. EXH. A-46)
AND
KLEENSEAL FITTING (PLF. EXH. 27A)



Defendant's Exhibit A80

DRAWING OF PLF'S
EXH. 62 AND 62A

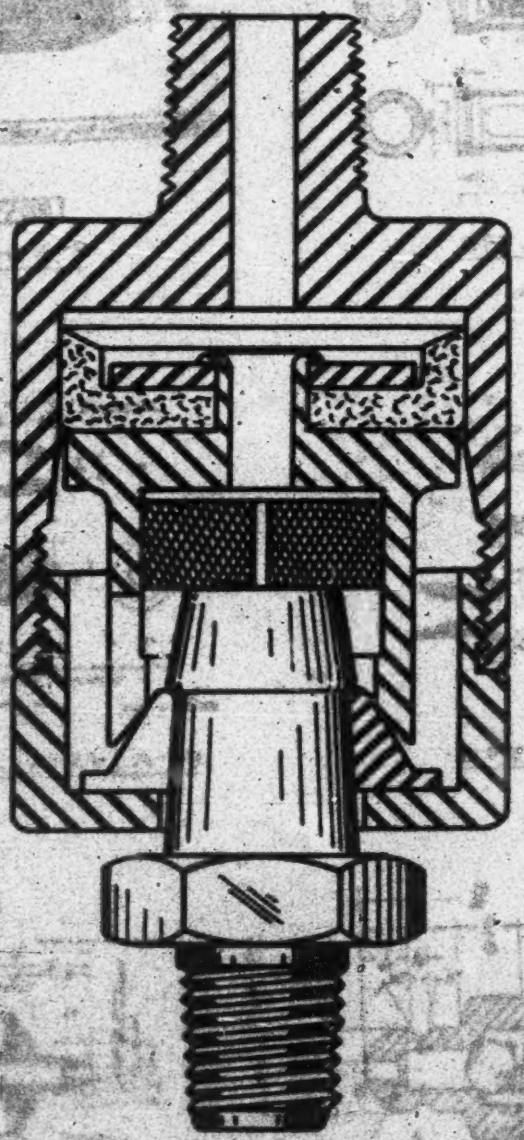


Defendant's Exhibit [redacted]

Defendant's Exhibit A81

DRAWING OF PL[redacted]

EXH. 63 AND 63 A.



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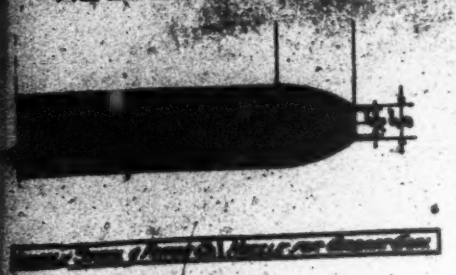
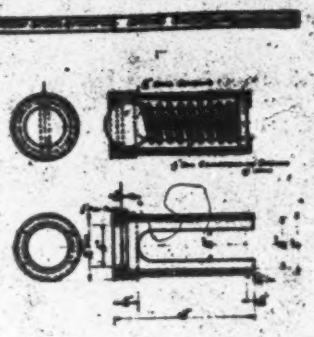
Defendant's Exhibit C3

—LINCOLN—

BARREL OR NEEDLE NOZZLES AND INSIDE-CONTACT FITTINGS THEREFOR

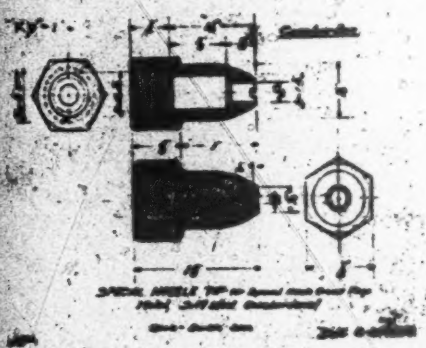


DFT. EXH. A-9

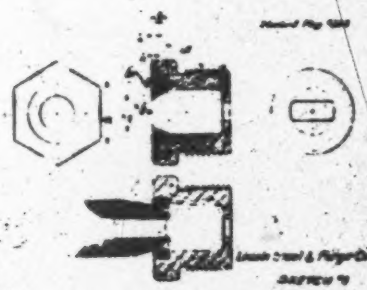


1920

DFT. EXH. A-8

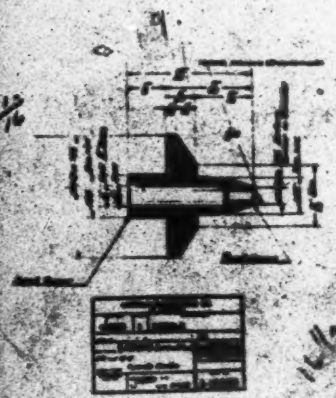


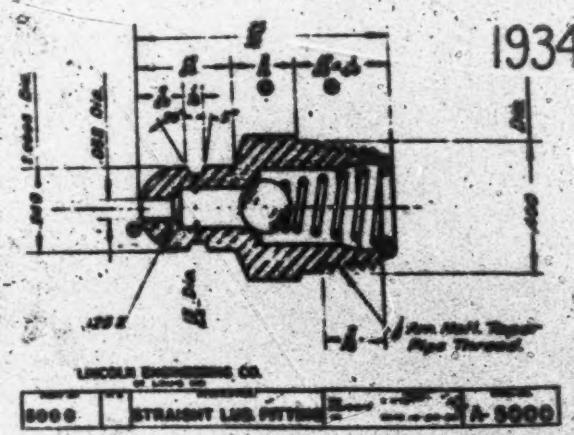
DFT. EXH. A-28, A-29



1927

DFT. EXH. A-30





1934

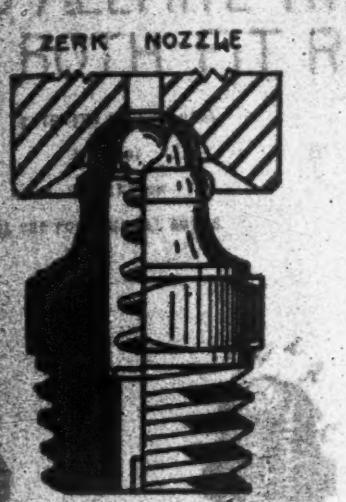
DRAWING OF PLF. EXH. 27A

Page Cut Off At Bottom

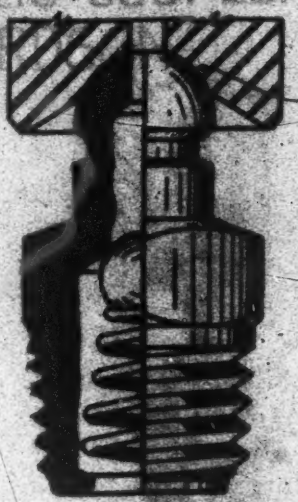
Defendant's Exhibit C17

CHART 17

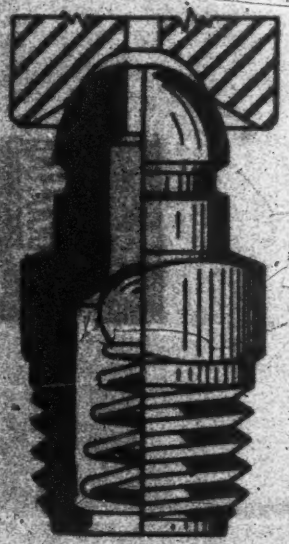
LINCOLN AND 1851 RICHARDSON FITTINGS BOTH FIT THE ZERK NOZZLE

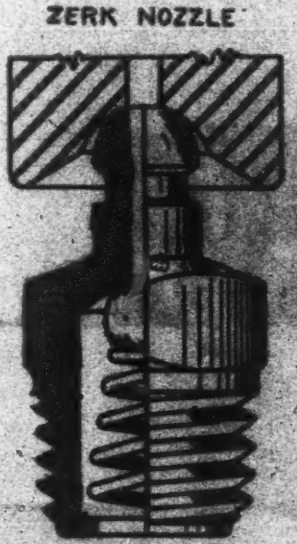


RICHARDSON FITTING OF 1851



LINCOLN FITTING (KLEENSEAL)





SUPPOSITITIOUS RELATION IF LINCOLN RADIUS

OVERSIZE ← WERE → UNDERSIZE

425

425

Defendant's Exhibit C18

CHART 18

LINCOLN KLEENSEAL NOZZLE AND ALEMITE HYDRAULIC COUPLER BOTH FIT RICHARDSON

PATENTED JULY 29, 1851.

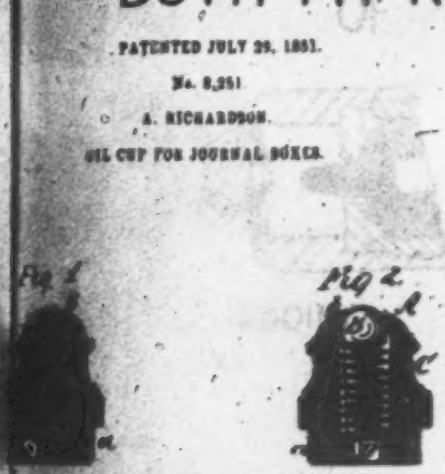
No. 8,251

A. RICHARDSON.

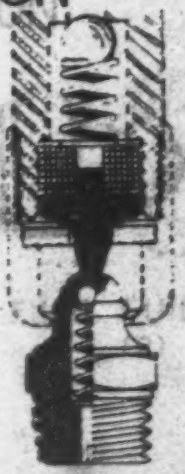
OIL CUP FOR JOURNAL BOXES.

Fig 1

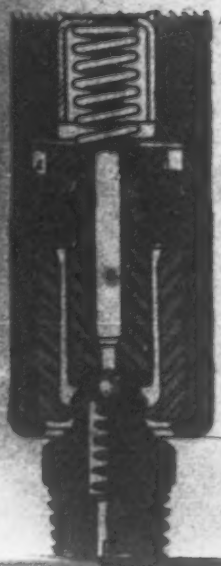
Fig 2.



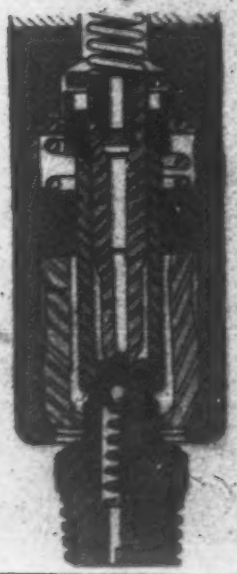
RICHARDSON FITTING OF 1851



LINCOLN KLEENSEAL NOZZLE APPLIED TO WORKING MODEL OF RICHARDSON



ALEMITE HYDRAULIC COUPLERS APPLIED TO WORKING MODEL OF RICHARDSON



427

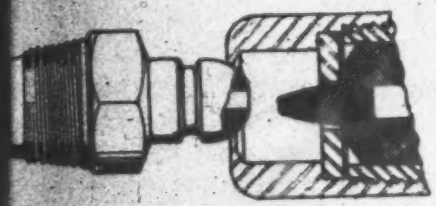
421

Defendant's Exhibit C24

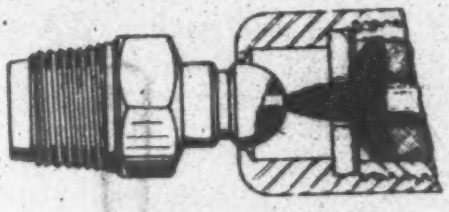
Defendant's Exhibit C19

CHART 19

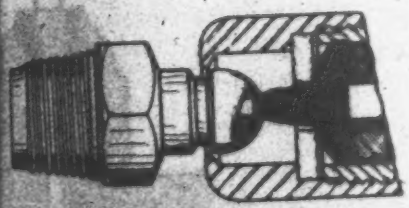
OPERATION OF LINCOLN KLEENSEAL SYSTEM OF LUBRICATION



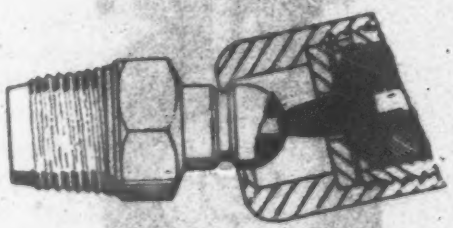
INITIAL GUIDING
(1)



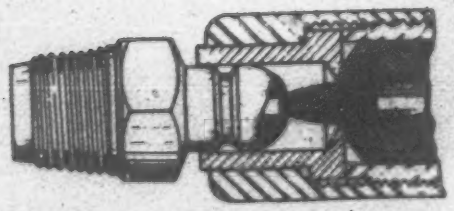
FINAL GUIDING
(2)



SEALING
(3)



ANGLING
(4)



AUXILIARY SNAP-ON SLEEVE
TELESCOPING

429

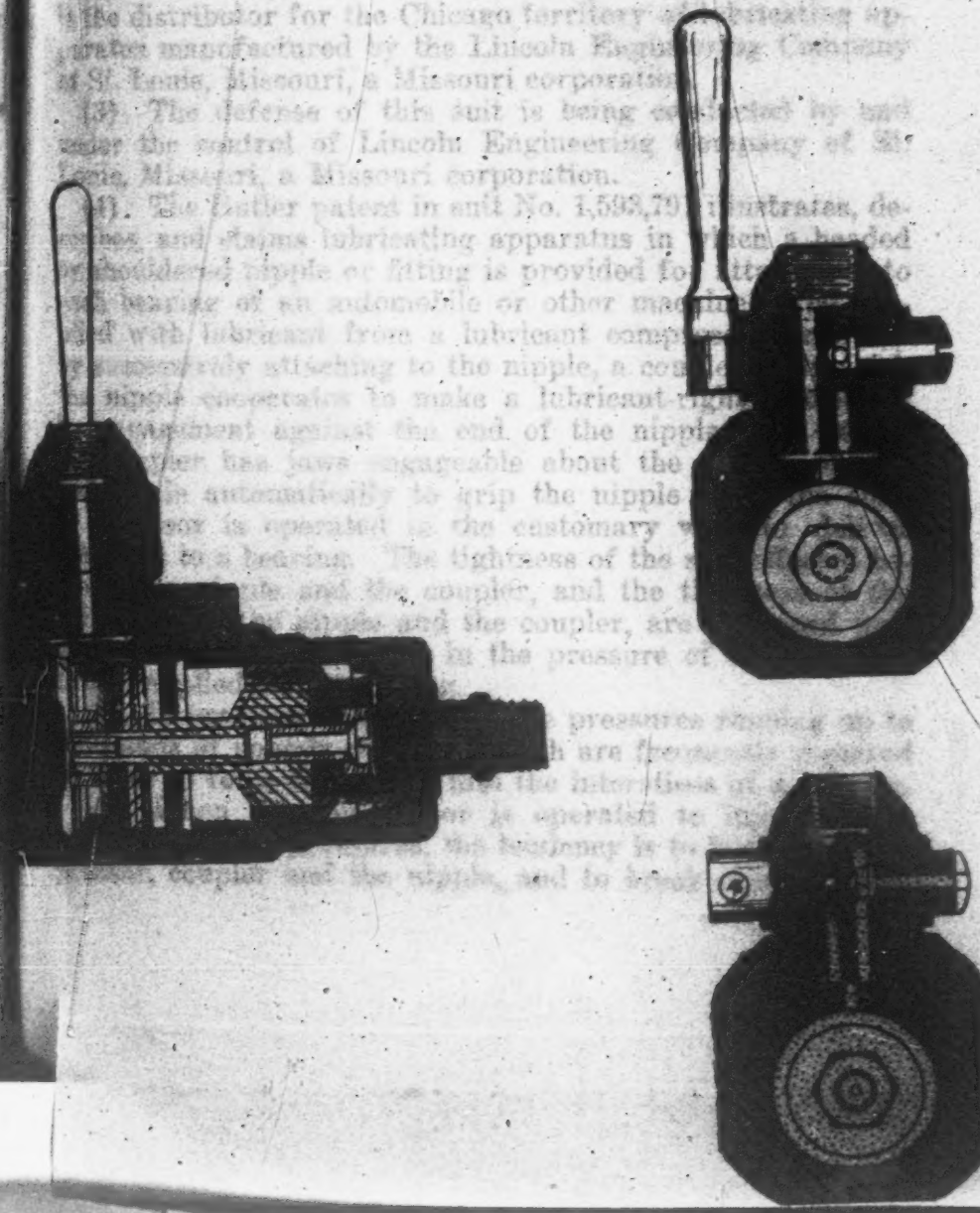
Findings of Fact and Conclusions of Law. 431

429

Defendant's Exhibit C24

CHART 24.

DEFENDANTS' WORKING MODEL OF NEWTON PATENT 1,118,876 IS THOROUGHLY OPERATIVE FOR LUBRICATION AT HIGH PRESSURE



602 And on, to wit, the 15th day of July, 1936, there was filed in the Clerk's office of said Court a certain Findings of Fact and Conclusions of Law in words and figures following, to wit: Filed July 15, 1936.

603 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—13955) * *

I find the facts to be as follows:

(1) Plaintiff is a Virginia corporation and is the owner of the Butler patent No. 1,593,791, and of all rights thereunder.

(2) Defendant Lincoln Engineering Company of Illinois is the distributor for the Chicago territory of lubricating apparatus manufactured by the Lincoln Engineering Company of St. Louis, Missouri, a Missouri corporation.

(3) The defense of this suit is being conducted by and under the control of Lincoln Engineering Company of St. Louis, Missouri, a Missouri corporation.

(4) The Butler patent in suit No. 1,593,791 illustrates, describes, and claims lubricating apparatus in which a headed or shouldered nipple or fitting is provided for attachment to each bearing of an automobile or other machine to be supplied with lubricant from a lubricant compressor or pump by successively attaching to the nipple, a coupler with which the nipple cooperates to make a lubricant-right connection by engagement against the end of the nipple, and which coupler has jaws engageable about the throat of the
604 nipple automatically to grip the nipple when the compressor is operated in the customary way to deliver lubricant to a bearing. The tightness of the seal effected between the nipple and the coupler, and the tightness of the grip between the nipple and the coupler, are increased proportionately with increases in the pressure of the lubricant being supplied to the bearing.

(5) In practical operation grease pressures running up to thousands of pounds per square inch are frequently required in order to force the grease into the interstices of a bearing.

(6) When the compressor is operated to inject grease under these high pressures, the tendency is to burst the compressor, coupler and the nipple, and to break open the con-

nection between the coupler and the nipple by forcing these parts as under.

(7) Because of the tremendous pressures which must be developed in a lubricating system, it is important in order to prevent leakage of lubricant to secure the maximum tightness of seal and the maximum mechanical grip. Both the strength of the grip and the tightness of the seal must be proportional to the pressure of the grease to be transmitted. If the seal is not sufficiently tight, the grease will escape,—and the requisite pressure cannot be developed. If the grip is not sufficiently strong, the parts will be forced asunder.

(8) In the Butler combination the automatic end seal and the automatic grip both become more effective as the lubricant pressure increases and the need for a more effective seal and grip becomes greater.

(9) In the Butler patent the end seal member is moveable and thus may adjust itself to fittings of slightly different dimensions.

605 (10) Any resiliency in part 42, referred to in the Butler patent as constituting "spring fingers," serves the purpose of compensating for any slight out-of-roundness of the fitting.

(11) Butler, applicant for the patent in suit, presented to his solicitors for the purpose of preparing the application for the patent in suit, a sample device including a coupler, the jaws of which were forced into clamping engagement with the nipple by a relatively rigid, hollow cylindrical part, corresponding exactly to the disclosure in Fig. 2 of the Butler patent here in suit. Claim 2 of the patent describes this early sample of the invention.

(12) Butler was the first to propose or to devise a lubricating system in which the sealing of the joint between the end of the nipple and the coupler, and the mechanical grip between the nipple and the coupler, were effected automatically by the pressure of the lubricant in and by the normal pumping operation of the compressor.

(13) Claim 2 of the Butler patent describes in more or less detail, a combination of seven elements which may be enumerated as nipple, compressor, cylinder, piston, aperture, jaws, and sealing seat. Each and all of these parts cooperate with one another in new ways in the accomplishment of a new and unitary result.

(14) Prior to manufacturing and selling the Alemite Hy-

draulic system of the patent in suit (exemplified in Plaintiff's Exhibits 13 to 20 and 22 to 25, inclusive) plaintiff sold lubricating apparatus (Plaintiff's Exhibits 9 and 12) of the types illustrated in Gullborg patent No. 1,307,734 and Zerk patent No. 1,475,980.

606 (15) Plaintiff commenced selling the Alemite Hydraulic lubricating equipment exemplified in Plaintiff's Exhibits 13 to 20 and 22 to 25, inclusive, in April, 1933.

(16) Plaintiff sold 281,555,000 of the Alemite Hydraulic fitting parts of the combination during the period from April, 1933, to March, 1936, and during this same period sold 6,306,000 of the Alemite Hydraulic coupler parts thereof.

(17) Of the 6,306,000 Alemite Hydraulic coupler parts sold during the period from April, 1933, to March, 1936, approximately 4,485,000 were sold with their associated compressors to automobile manufacturers, to be put in the tool kits of the cars at the factory.

(18) The Alemite Hydraulic lubricating equipment embodying the invention of the patent in suit rapidly superseded the Gullborg and the Zerk lubricating equipment because:

(a) Under this equipment, it was not necessary to manipulate any coupler mechanism in the operation of attaching and detaching the coupler to and from the fitting,—as was necessary in effecting a connection between a Gullborg coupler and fitting, and

(b) It was not necessary for the user to apply force to hold the coupler against the fitting to prevent separation of these parts,—as was required in effecting a connection between the coupling nozzle and fitting of the Zerk lubricating system.

Within eight months after its introduction on the market, the plaintiff's Alemite Hydraulic system had been adopted as the factory lubricating equipment of every automobile and truck made in the United States, with the single exception of the Duesenberg.

607 (19) The mechanism embodied in the means by which the jaws are compressed about the nipple of the Alemite Hydraulic system, is identical in its mechanical principles with that disclosed in the Butler patent. It is a simple equivalent involving a mere reversal of parts.

(20) The Alemite Hydraulic system comprises the combination of elements set forth in claim 2 of the Butler patent.

(21) The Lincoln Engineering Company of Missouri initially engaged in the business of making and selling automobile lubricating equipment in 1925, supplying its equipment exclusively to plaintiff. This relationship between the Lincoln Company and the plaintiff continued for several years thereafter, until 1933.

(22) When, shortly after January 1, 1933, Lincoln Engineering Company began selling automobile lubricating apparatus to others than Alemite, the sales of such apparatus, equipped with couplers or nozzles of its own manufacture, were made with the knowledge and expectation that the purchasers would use the apparatus in combination and conjunction with Alemite fitting.

(23) In May, 1933, Mr. A. P. Fox, the vice-president and designing engineer of Lincoln Engineering Company of Missouri, became familiar with the nipple parts of the Alemite Hydraulic system. Although he had known of the compressor and coupler parts at an earlier date, he became familiar with them at least as early as January, 1935.

(24) The Lincoln Company's Kleenseal nipples were thereafter sold with the knowledge that they could be substituted for the plaintiff's nipple part of the Alemite Hydraulic combination, and that they would be so combined in use. Claim 2 applies to the combination in the same way, regardless whether it incorporates the Lincoln Company's Kleenseal nipple part of the plaintiff's nipple part.

608 (25) The dimensions of the Lincoln Kleenseal fitting are exactly such as to make it cooperate satisfactorily with an Alemite Hydraulic coupler. If the dimensions selected had been slightly different, such cooperation would have been impossible. Similar fittings of slightly different dimensions would have had all other utilities which have been ascribed to the Lincoln Company's fittings, and would have cost no more to make.

(26) The defendants John R. LeVally and Frederick A. Faville did not, as individuals, either jointly or severally, sell any Lincoln Kleenseal fittings.

(27) Defendants sold "Lincoln Kleenseal" fittings with the knowledge that they were to be used in combination with the compressor and coupler parts of the Butler combination as sold by the plaintiff for use with plaintiff's Alemite Hydraulic coupler equipped grease guns.

(28) The Lincoln Engineering Company of Missouri ex-

pected that automobiles equipped with the Lincoln nipple part of the combination and sold in the United States, would be lubricated at garages and service stations. The plaintiff had previously sold millions of the compressors and coupler parts of the combination, and had endeavored to supply every public garage and service station in the United States.

(29) The Lincoln Engineering Company of Missouri in its Kleenseal fittings, duplicated, fitting for fitting, all of the arbitrary dimensions of the entire line of Alemite Hydraulic fittings.

(30) The Lincoln Engineering Company did not sell any of its grease guns or nozzles to automobile manufacturers for tool kit equipment of automobiles sold in the United States, even though the automobiles were equipped with Lincoln Kleenseal fittings.

609 (31) There is nothing in the Butler patent which requires the use of spring fingers which can yield a substantial amount.

(32) The Lincoln Engineering Company initially submitted to the Standards Division of General Motors Corporation a fitting like the Kleenseal fitting, but without the peripheral groove or shoulder or head. But General Motors never purchased these ungrooved fittings. Instead, it purchased the Kleenseal fittings having the groove, and cooperable with Alemite Hydraulic couplers.

(33) The Alemite Hydraulic coupler will grip and form a sealed connection with a Lincoln Kleenseal fitting as well as with an Alemite Hydraulic fitting and claim 2 of the Butler patent describes one combination as well as the other.

(34) Defendant's model of Fig. 2 of the Butler patent does not accurately or fairly represent the invention of Butler.

(35) Defendants' Exhibit A-61 does not correspond to the alleged drawing thereof, Defendants' Exhibit C-21.

(36) Defendants' expert, stated, that none of the prior art except Winkley Reissue Patent No. 14,667 accomplishes the results obtained by the Butler patent.

(37) The Winkley Reissue patent No. 14,667 does not disclose the radially movable locking elements, the piston, or the means actuated by the piston for compressively clutching the locking elements upon the nipple, as Butler's invention is defined in claim 2 of his patent. The Winkley patent discloses a coupler having a spring pressed sealing member. It is not in any way analogous to the combination of elements defined in Butler's claim 2.

610 (38) The particular shape of the oil cup shown in the Richardson patent No. 8,251 has no significance of functional utility.

(39) The patents to Paul No. 621,276, Ulleland No. 1,253,309, and Pinel French No. 327,557, each discloses a construction readily distinguishable from that claimed by Butler in that in each of these prior art patents the locking elements are not actuated by any piston not automatically by the pressure of the grease.

(40) The patent to Newton No. 1,118,876 discloses a train hose testing appliance which was never intended to be used for high pressure lubrication and could not be used for such purpose without making a great many alterations of an inventive character in its construction. It does not embody the combination of Claim 2 of the Butler patent.

(41) Defendants' representation, Exhibit A-68, differs in many material respects from the disclosure of the Newton patent No. 1,118,876, but even with all of the changes which have been incorporated in it in an endeavor to make it work, it is not a commercially feasible or practically operative device for high pressure lubrication.

My conclusions of law are as follows:

(1) This Court has jurisdiction of this suit and of all of the parties thereto.

(2) The Lincoln Engineering Company of Missouri is bound by the decree herein.

(3) Defendants John R. LeVally and Frederick A. Faville did not, as individuals, either jointly or severally, infringe claim 2 of the Butler patent, and the bill of complaint should be dismissed as to these parties.

(4) Claim 2 of the Butler patent No. 1,593,791 describes a new and useful improvement in lubricating apparatus.

611 The combinations of elements set forth in this claim are not anticipated by any combination disclosed in any patent, publication, or prior use antedating the application for the Butler patent.

(5) Butler was the first to have invented the combination set forth in claim 2 of his patent No. 1,593,791.

(6) The Butler patent contains an adequate disclosure of a novel form of lubricating apparatus which could be made and used for the intended purpose by a mechanic skilled in the art of making lubricating apparatus.

(7) All of the parts of the lubricating system invented by Butler and disclosed in his patent, cooperate in a novel man-

ner to produce a new and unitary result. Each part is dependent upon the other for the performance of its functions, and each part performs new functions because of the presence and cooperation of the other parts.

(8) Claim 2 of the Butler patent No. 1,593,791 is valid.

(9) Defendants have contributorily infringed claim 2 of the Butler patent by their sales of Kleenseal nipples or fittings exemplified in Plaintiff's Exhibits 27a and 27b.

(10) Plaintiff is entitled to a writ of permanent injunction enjoining and restraining the defendant Lincoln Engineering Company of Illinois, its officers, agents, employees, associates and confederates, from making, using, and selling lubricating apparatus, particularly fittings of the kind exemplified in Plaintiff's Exhibits 27a and 27b, or any other device or devices embodying the invention of claim 2 of Butler patent No. 1,593,791, or any of the parts thereof, or any of the coupler or fitting parts adapted and intended to be used in combinations embodying the invention of said patent, and from offering or advertising so to do, and from aiding or abetting, or in
612 any way contributing to the infringement of said patent.

(11) Plaintiff is entitled to recover from the defendants the profits which said defendants have made, and the damages which plaintiff has suffered by reason of the said defendants' infringement of the Butler patent in suit, and to recover its costs and disbursements of this proceeding, in accordance with the statutes and rules in such cases made and provided.

I adopt as a part of these findings and conclusions of law and incorporate herein as a part hereof by reference all findings and conclusions of law included in my memorandum opinion entered as of even date hereof.

Entered this ..... day of July, A. D. 1936.

Walter C. Lindley,
Judge.

Filed July 15, 1936.

613 And afterwards, to wit, on the 31st day of August, 1936, being one of the days of the regular July term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable Walter C. Lindley, District Judge appears the following entry, to wit:

Entered Aug. 31, 1938.

614 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—13,955) * *

DECREE.

This cause came on to be heard at this term, and by order of the Court was submitted by counsel on briefs and extended written arguments, but without oral argument; and thereupon, upon consideration thereof, it was ordered, adjudged and decreed as follows, viz:

1. That the plaintiff, Stewart-Warner Corporation, is the owner of United States Letters Patent No. 1,593,791, issued July 27, 1926, to Clyde G. Butler, and of all rights under said Letters Patent.

2. That claim 2 of said Butler patent No. 1,593,791 is good and valid in law.

3. That the defendant Lincoln Engineering Co. of Illinois has contributorily infringed claim 2 of said Butler patent No. 1,593,791, by the sale of "Lincoln-Kleenseal" nipples or fittings of the types illustrated in Bulletin 111 of the Lincoln Engineering Co. of Missouri, Defendants' Exhibit A-53 herein, and exemplified in Plaintiff's Exhibits 27a and 27b herein, and thereby violated the rights of the plaintiff under said Letters Patent.

615 4. That the defendants John R. LeVally and Frederick A. Faville, as individuals, and doing business as Lincoln Engineering Company of Illinois, have not infringed said Butler patent No. 1,593,791; and as to said defendants the bill of complaint is dismissed, on plaintiff's motion, at plaintiff's costs, to be taxed by the clerk, and that said defendants have execution therefor.

5. Lincoln Engineering Company of St. Louis, Missouri, a Missouri corporation, manufacturer of the "Lincoln-Kleenseal" nipples or fittings sold by defendant Lincoln Engineering Co. of Illinois, entered no appearance as a party to the suit but appeared by counsel and openly and avowedly assumed and exercised the control of the defense of this suit.

6. That a writ of permanent injunction issue forthwith, enjoining and restraining, throughout the United States, the defendant, Lincoln Engineering Co. of Illinois, its officers, agents, servants, employees, and attorneys, or those in active concert or participating with them, and who shall, by personal service or otherwise, have received actual notice of said

injunction, from making, using, or selling lubricating-receiving nipples or fittings of the kind illustrated in Bulletin 111 of the Lincoln Engineering Co. of Missouri, and exemplified by Defendants' Exhibit A-53 and by Plaintiffs' Exhibits 27a and 27b herein, or any similar device or devices embodying the invention of claim 2 of Butler patent No. 1,593,791, and any such nipples or fitting parts adapted or intended to be used in combinations embodying the invention described in claim 2 of said patent, and from offering or advertising so to do, and from aiding or abetting, or in any way contributing to, the infringement of said claim of said patent.

7. That the plaintiff recover from defendant Lincoln Engineering Co. of Illinois, the profits which said defendant has made by reason of said defendant's infringement of said
616 claim of said Letters Patent and the damages the plaintiff has sustained thereby; and that this cause be referred to a Master of this court, to be appointed, to take and report an account of such profits and damages, and that the said defendant, its officers, agents, clerks, and employees, be required to attend before such Master from time to time as he shall direct, and to produce before him all books, papers, writings, vouchers and other documents applicable to said reference, and to submit to such oral examination as he may direct.

8. That plaintiff recover from defendant Lincoln Engineering Co. of Illinois, plaintiff's costs of this suit; and that said defendant recover from plaintiff the taxable costs incident to the dismissal by plaintiff of the charge of infringement under Fesler patent No. 1,408,573, and incident to the dismissal of the charge of infringement in the manufacture or sale of the Model ND 5 Lincoln Engineering Co. Lubrigun nozzle (as to both of which plaintiff dismissed during the opening statement at the trial without prior notice), said costs to be taxed by the clerk, and that the respective parties have execution therefor.

Walter C. Lindley,
United States District Judge.

August 28, 1936.

617 And on, to wit, the 12th day of September, 1936, came the Plaintiff by its attorneys and filed in the Clerk's office of said Court a certain Motion to Vacate Decree in words and figures following, to wit:

618 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

MOTION TO VACATE DECREE ENTERED AUGUST 28, 1936.

Now comes the plaintiff, Stewart-Warner Corporation, and moves that the decree entered August 28, 1936, in this cause be set aside and vacated and the accompanying decree entered in its place because in said decree entered on August 28, 1936, the injunctive paragraph (6) thereof is too broad in that defendant is enjoined from making or selling lubricant-receiving nipples or fittings for use in foreign countries, contrary to the law as set forth in the following decisions:

Radio Corp. of America et al. *vs.* Andrea et al., 79 Fed. (2d) 626; 27 Pat. Q. 364;

Sutton et al. *vs.* Gulf Smokeless Coal Co. et al;

Roberts & Schaefer Co. *vs.* Sutton et al.; 77 Fed. (2d) 439; 25 Pat. Q. 219.

Lynn A. Williams,
Williams, Bradbury, McCaleb & Hinkle,
Attorneys and Counsel for Plaintiff.

September ....., 1936.

Entered Oct. 5, 1936.

619 And afterwards, to wit, on the 5th day of October, 1936, being one of the days of the regular October term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable Walter C. Lindley, District Judge appears the following entry, to wit:

620 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

ORDER VACATING DECREE OF AUGUST 28, 1936.

This cause having come on to be heard at this term upon the motion of plaintiff for an order vacating the decree entered herein on August 28, 1936, and for the entry of a substitute decree presented this day, counsel having been heard, and the Court having been advised in the premises,

It Is Hereby Ordered

That the decree heretofore entered in this cause on August

28, 1936, and the writ of injunction issued thereupon, be, and hereby are, vacated.

Walter C. Lindley,
United States District Judge.

October 5, 1936.

621 And afterwards, to wit, on the 5th day of October, 1936, being one of the days of the regular October term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable Walter C. Lindley, District Judge appears the following entry, to wit: Entered Oct. 5, 1936.

622 UNITED STATES DISTRICT COURT.
* * (Caption—13955) * *

DECREE.

This cause came on to be heard at this term, and by order of the Court was submitted by counsel on briefs and extended written arguments, but without oral argument; and thereupon, upon consideration thereof, it was ordered, adjudged and decreed as follows, viz:

1. That the plaintiff, Stewart-Warner Corporation, is the owner of United States Letters Patent No. 1,593,791, issued July 27, 1926, to Clyde G. Butler, and of all rights under said Letters Patent.

2. That claim 2 of said Butler patent No. 1,593,791 is good and valid in law.

3. That the defendant Lincoln Engineering Co. of Illinois has contributorily infringed claim 2 of said Butler patent No. 1,593,791, by the sale of "Lincoln-Kleenseal" nipples or fittings of the types illustrated in Bulletin 111 of the Lincoln Engineering Co. of Missouri, Defendants' Exhibit A-53 herein, and exemplified in Plaintiff's Exhibits 27a and 27b herein, and thereby violated the rights of the plaintiff under said Letters Patent.

623 4. That the defendants John R. LeVally and Frederick A. Faville, as individuals, and doing business as Lincoln Engineering Company of Illinois, have not infringed said Butler patent No. 1,593,791; and as to said defendants the bill of complaint is dismissed, on plaintiff's motion, at plaintiff's costs, to be taxed by the clerk, and that said defendants have execution therefor.

5. Lincoln Engineering Company of St. Louis, Missouri, a Missouri corporation, manufacturer of the "Lincoln-Kleenseal" nipples or fittings sold by defendant Lincoln Engineering Co. of Illinois, entered no appearance as a party to the suit but appeared by counsel and openly and avowedly assumed and exercised the control of the defense of this suit.

6. That a writ of permanent injunction issue forthwith, enjoining and restraining, throughout the United States, the defendant, Lincoln Engineering Co. of Illinois, its officers, agents, servants, employees, and attorneys, or those in active concert or participating with them, and who shall, by a personal service or otherwise, have received actual notice of this injunction, from using, or making or selling for use within the United States lubricating-receiving nipples or fittings of the kind illustrated in Bulletin 111 of the Lincoln Engineering Co. of Missouri, and exemplified by Defendants' Exhibit A-53 and by Plaintiff's Exhibits 27a and 27b herein, or any similar device or devices embodying the invention of claim 2 of Butler patent No. 1,593,791, and any such nipples or fitting parts adapted or intended to be used in combinations embodying the invention described in claim 2 of said patent, and from offering or advertising so to do, and from aiding or abetting, or in any way contributing to, the infringement of said claim of said patent.

624 7. That the plaintiff recover from defendant Lincoln Engineering Co. of Illinois, the profits which said defendant has made by reason of said defendant's infringement of said claim of said Letters Patent and the damages the plaintiff has sustained thereby; and that this cause be referred to a Master of this court, to be appointed, to take and report an account of such profits and damages, and that the said defendant, its officers, agents, clerks, and employees, be required to attend before such Master from time to time as he shall direct, and to produce before him all books, papers, writings, vouchers and other documents applicable to said reference, and to submit to such oral examination as he may direct.

8. That plaintiff recover from defendant Lincoln Engineering Co. of Illinois, plaintiff's costs of this suit; and that said defendant recover from plaintiff the taxable costs incident to the dismissal by plaintiff of the charge of infringement under Fesler patent No. 1,408,573, and incident to the dismissal of the charge of infringement in the manufacture or sale of the Model ND 5 Lincoln Engineering Co. Lubrigun nozzle (as to both of which plaintiff dismissed during the opening statement at the trial without prior notice), said

costs to be taxed by the clerk, and that the respective parties have execution therefor.

Walter C. Lindley,
United States District Judge.

October 5, 1936.

625 And on, to wit, the 26th day of October, 1936 came the Defendants by their attorneys and filed in the Clerk's office of said Court a certain Petition for Appeal in words and figures following, to wit: Filed Oct. 26, 1936.

626 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—13955) * *

PETITION FOR APPEAL.

Lincoln Engineering Co., of Illinois, one of the above-named defendants, as petitioner herein, conceiving itself aggrieved by the decree made and entered by the above-named District Court in the above-entitled cause on August 28th, 1936 (as to which a petition for rehearing was denied on October 5, 1936); and conceiving itself aggrieved by the decree made and entered by the above-named District Court in the above-entitled cause on October 5, 1936; and conceiving itself aggrieved by the order[1] made and entered by the above-named District Court in the above-entitled cause on October 5, 1936, does hereby appeal to the United States Circuit Court of Appeals for the Seventh Circuit from said decree of
627 August 28, 1936 and from said decree of October 5, 1936[2] and from said order of October 5, 1936[3]; —all for the rea-

[1] wherein the District Court rendered a decision upon its examination of the evidence submitted on defendant's Petition for rehearing (filed respecting the decree of August 28, 1936) and made its further Findings of Fact and Conclusions of Law in support of its decree of August 28, 1936 and/or its decree of October 5, 1936, and wherein it made its Order denying said defendant's Petition for Rehearing respecting said decree of August 28, 1936 and/or respecting said decree of October 5, 1936.

[2] or from that one of said two decrees as may be the effective decree of the District Court in view of the vacation of the first of said two decrees upon plaintiff's motion made after the expiration of the term in which such final decree was entered.

[3] Insofar as said Order of October 5, 1936 explains and bears upon said decree of August 28, 1936 and/or said decree of October 5, 1936 and/or insofar as said order of October 5, 1936 supplies further and additional Findings of Fact and Conclusions of Law of the District Court in support of said decree of August 28, 1936, and/or said decree of October 5, 1936 and insofar as said order of October 5, 1936, denies defendant's said petition for rehearing.

sons set forth in the assignment of errors filed herewith; and defendant-petitioner prays that its appeal be allowed, that citation issue as provided by law, and that the entire transcript of record and proceedings and all papers and exhibits filed in this cause, duly authenticated, be sent to the United States Circuit Court of Appeals for the Seventh Circuit, in accordance with the laws and rules in such cases made and provided.

And defendant-petitioner further prays that a proper order be made relating to the appeal bond to be given by defendant-petitioner upon allowance of appeal, herein prayed and the giving of such bond.

Lincoln Engineering Co. of Illinois,
Defendant-Petitioner,
By Wilkinson, Huxley, Byron & Knight,
Its Attorneys.

Delos G. Haynes,
L. L. Kalish,
Counsel for Defendant-Petitioner.

October 23, 1936.

Filed Oct. 26, 1936.

628 And on, to wit, the 26th day of October, 1936 came the Defendants by their attorneys and filed in the Clerk's office of said Court a certain Assignment of Errors in words and figures following, to wit:

629 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—13955) * *

ASSIGNMENT OF ERRORS.

Now comes Lincoln Engineering Co. of Illinois, one of the above-named defendants, and in connection with its accompanying petition for appeal filed herewith in the above-entitled cause, files the following assignment of errors on which it will rely on its appeal to the United States Circuit Court of Appeals for the Seventh Circuit:

(1) The District Court erred in decreeing that claim 2 of Butler patent No. 1,593,791 is good and valid in law.

(2) The District Court erred in decreeing that petitioner has contributorily infringed claim 2 of the Butler patent by the sale of "Lincoln Kleenseal" nipples or fittings of the

type exemplified in Plaintiff's Exhibits 27a and 27b and illustrated in a certain Bulletin 111 constituting Defendants' Exhibit A-53.

(3) The District Court erred in holding and decreeing, in effect, that Butler, by devising or inventing a new and improved hose-coupler or conduit-coupler adapted for use in establishing the temporary sealed connection between the 630 old grease-guns of the prior art and the old lubricant-receiving "fittings" or "nipples" of the prior art, may not only patent, claim and monopolize his new hose-coupler or conduit-coupler but may also re-monopolize such old lubricant-receiving "fittings" or "nipples" by claiming his specifically new and improved hose-coupler or conduit-coupler in combination broadly with the old lubricant-dispensing pump, compressor or grease-gun of the prior art and the old lubricant-receiving "fitting" or "nipple" of the prior art and then (after giving wide commercial distribution to the allegedly improved hose-couplers or conduit-couplers by or through aggressive commercial or business enterprise)
invoking the doctrine of contributory infringement against others' manufacture and sale of the old lubricant-receiving "nipple" or "fitting" of the prior art for use with the improved hose-coupler or conduit- coupler manufactured by the patentee;—all contrary to and in conflict with the decision of the Supreme Court in the case of *Rogers* v. *Alemite*, ... U. S. .....; 56 S. Ct. 787; 80 L. Ed. 792, and the following cases cited in said decision of the Supreme Court:

Edison Electric Light v. *Peninsular Light Co.*, 101 Fed. 831;
Heald v. *Rice*, 104 U. S. 737, 755;
Underwood v. *Gerber*, 149 U. S. 224, 227, 229;
Morgan Envelope Co. v. *Albany Paper Co.*, 152 U. S. 425, 431, 432;
Carbice Corp. v. *Amer. Pats. Develop. Corp.*, 283 U. S. 27, 31, 32;
Wagner Typwriting Co. v. *Webster*, 144 Fed. 405, 409;
Langen v. *Warren Axe & Tool Co.*, 184 Fed. 720;
Harvey-Hubbell v. *General Electric*, 267 Fed. 564;
Troy Wagon Works v. *Ohio Trailer Co.*, 274 Fed. 612;
General Electric v. *Ohio Brass Co.*, 277 Fed. 917;
Radio Corporation v. *Lord*, 28 F. (2d) 257;
Wall Pump & Co. v. *Gardner Governor Co.*, 28 F. 334.

(4) The District Court erred in failing to decree that plaintiff's attempt to monopolize admittedly old "headed" lubricant-receiving "fittings" or "nipples" of the prior art, under Claim 2 of the Butler patent in suit[1], is the same as
631 plaintiff's former attempt to monopolize the admittedly old "bayonet" type lubricant-receiving "fittings" or "nipples" of the prior art under claims 1 to 10 of Gullborg patent No. 1,307,734[2], which former attempt was condemned by the Supreme Court in the case of *Rogers* v. *Alemite* (____ U. S. ____; 56 S. Ct. 787; 80 L. Ed. 792).

(5) The District Court erred in failing to distinguish between the patentability of a novel and inventive combination of old elements[3] which may make up a new and improved construction in a unitary or distinct mechanical device[4] of a recognized class[5], and the lack of patentability of the "combination" with such first-mentioned inventive mechanical device, of other complementary and separate and distinct mechanical devices of the prior art[6] with which the inventive device must be used;—where such other complementary, old, prior-art devices merely constitute the old mechanical environment in which all devices of the first-mentioned class have always been used in the past and must always be used.

632 (6) The District Court erred in finding and decreeing, in effect, that the allegedly improved result due to the new and improved hose-coupler construction is the result not merely of the improved hose-coupler construction, but is the result of, or flows from the "combination" therewith of an old grease-gun and an old grease-cup or so-called "nipple", merely because hose-couplers are customarily used, inter alia, to connect grease-guns with grease-cups or so-called "nipples".

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[1] which claims such old prior-art headed lubricant-receiving nipples in combination with an allegedly improved coupler and an old pump.

[2] which claims such old prior art "bayonet" type lubricant-receiving "fittings" or "nipples" in combination with an allegedly improved "bayonet" type conduit-coupler and an old pump or grease-gun.

[3] as perhaps the combination of cylinder part, the piston part, the aperture in the piston, the sealing seat on the piston and laterally or radically movable locking elements or jaws; all of which together make up or constitute a chuck-type conduit-coupler or hose-coupler of the Butler patent in suit.

[4] a "chuck" type conduit coupler or hose-coupler.

[5] the broad class of "chuck" type hose-couplers or conduit-couplers characterized by the use of radially movable locking jaws for gripping either smooth or headed or grooved "fitting" members in "chuck" fashion.

[6] as for instance, the old lubricant-dispensing pump or grease-gun of the prior art and the old lubricant-receiving "fitting" or "nipple" of the prior art.

(7) The District Court erred in failing to decree claim 2 of Butler Patent No. 1,593,791 invalid on the ground that it merely re-claims an old and exhausted "combination" of pump, conduit-coupler and lubricant-receiving "nipple", whereas the patentee's contribution, if any, is in an allegedly improved conduit-coupler.

(8) The District Court erred in failing to decree claim 2 of Butler patent No. 1,593,791 invalid on the ground that through such claim 2 the patentee and his assignee are attempting to monopolize admittedly old and unpatented lubricant-receiving "fittings" or "nipples"; by allegedly improving the hose-coupler element of the old combination (of pump, coupler and fitting) and repatenting the old combination by claiming it with the patentee's allegedly improved hose-coupler element substituted for the old hose-coupler element.

(9) The District Court erred in failing to decree that the patentee of the patent in suit who predicated a "combination" claim[7] upon some allegedly improved conduit-coupler or hose-coupler, cannot extend the monopoly of such "combination" patent to prevent the use of a "fitting" or "nipple" of the prior art with a prior-art grease-gun having a conduit-coupler or hose-coupler such as allegedly claimed in the patent in suit.

633 (10) The District Court erred in finding and decreeing, in effect, that plaintiff's so-called "Alemite Hydraulic" coupler (variously exemplified in specimens and identified by drawings introduced in evidence) embodies the coupler construction disclosed in Butler patent No. 1,593,791 and defined in the coupler-defining portion of the language of Claim 2 thereof;—the District Court's aforesaid erroneous finding and decree being also contrary to and in conflict with the opposite holding of the Court of Appeals for the Eighth Circuit in plaintiff's suit against Jiffy Lubricating Co., 81 Fed. (2d) 786[8], which Court held that plaintiff has not commercially manufactured the coupler defined in the coupler-defining portion of the language of claim 1[9] of Butler patent No. 1,593,791.

(11) The District Court erred in finding and decreeing, in effect, that the combination of defendant's admittedly unpatented "Lincoln Kleenseal" "nipple" or grease-cup or "fitting", with plaintiff's commercial "Alemite-hydraulic"

[7] reciting an admittedly old pump, an allegedly new coupler and an admittedly old "fitting."

coupler and plaintiff's admittedly unpatented compressor or grease-gun, responds to claim 2 of Butler Patent No. 1,593,791; —the District Court's aforesaid erroneous finding and decree being also contrary to and in conflict with the opposite holding of the Court of Appeals of the Eighth Circuit in plaintiff's suit against Jiffy Lubricating Co., 81 Fed. (2d) 786[8], which held that plaintiff has not commercially manufactured the coupler defined in the coupler-defining portion of the language of claim 1[9] of Butler patent No. 1,593,791.

634 (12) The District Court erred in construing Butler claim 2 by or in the light of a different hose-coupler construction introduced in evidence by plaintiff (plaintiff's Exhibit 8) which different hose-coupler construction is not disclosed in the patent in suit.

(13) The District Court erred in failing to decree Butler claim 2 invalid in view of the prior art as exemplified in the record.

(14) The District Court erred in finding and decreeing, in effect, that the commercial success of plaintiff's commercial "Alemite-Hydraulic" couplers and grease-guns was due to the alleged coupler construction, pump and "nipple", disclosed in the Butler patent in suit and defined in claim 2 thereof.

(15) The District Court erred in finding and decreeing, in effect, that the plaintiff's commercial "Alemite-Hydraulic" coupler and its variety of commercial "Alemite-Hydraulic" compressors or grease-guns, and its so-called "Alemite-Hydraulic" lubricant-receiving "nipples" embody the construction disclosed in the Butler patent in suit and defined in claim 2 thereof.

(16) The District Court erred in failing to grant and in denying (in its Order of October 5, 1936) defendant's petition for rehearing filed on September 5, 1936, with respect to the District Court's Decree of August 28, 1936; particularly since both the plaintiff[10] and the Court[11] stated that one ground[12] of said petition was correct.

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[8] plaintiff's petition for certiorari was denied .... U. S. .... on October 12, 1936.

[9] the coupler-defining portion of claim 1 being substantially the same as the coupler-defining portion of claim 2.

[10] In its motion to vacate the decree of August 28, 1936.

[11] In its opinion and order of October 5, 1936, vacating the decree of August 28, 1936.

[12] That the decree should not extend to manufacturing and sale for export.

635 (17) The District Court erred in finding and decreeing that the Lincoln Engineering Company of St. Louis, Missouri has appeared in this suit.

(18) The District Court erred in finding and decreeing, in effect, that the case of *Stewart-Warner* v. *Jiffy*, 81 Fed. (2d) 776 (C. C. A. 8) is of no aid in the decision of this case.

(19) The District Court erred in finding and decreeing, in effect, that the decision of the Supreme Court in *The Bassick Mfg. Company* v. *The R. M. Hollingshead Company, G. S. Rogers, et al.* v. *Alemite Corporation*, 56 S. Ct., 787, 80 Law Ed. 782, is of no help in the present case, except insofar as it implies that if the device had been shown to be of the suction type, its manufacture and sale would have been held to constitute contributory infringement.

(20) The District Court erred in decreeing in the decree of August 28, 1936, that plaintiff is entitled to a writ of permanent injunction to issue forthwith, enjoining and restraining, throughout the United States, the defendant-petitioner, its officers, agents, servants, employees, and attorneys, or those in active concert or participating with them, and who shall, by personal service or otherwise, have received actual notice of said injunction, from making, using, or selling lubricating-receiving nipples or fittings of the kind illustrated in Bulletin 111 of the Lincoln Engineering Co. of Missouri, and exemplified by Defendants' Exhibit A-53 and by plaintiff's Exhibits 27a and 27b herein, or any similar device or devices embodying the invention of claim 2 of Butler patent No. 1,593,791, and any such nipples or fitting parts adapted or intended to be used in combinations embodying the invention described in claim 2 of said patent, and from offering or advertising so to do, and from aiding or abetting, or in any way contributing to, the infringement of said claim of said patent.

636 (21) The District Court erred in decreeing in the decree of October 5th, 1936, that plaintiff is entitled to a writ of permanent injunction to issue forthwith, enjoining and restraining, throughout the United States, the defendant-petitioner, its officers, agents, servants, employees and attorneys, or those in active concert or participating with them, and who shall, by personal service or otherwise, have received actual notice of said injunction, from making using or selling for use within the United States lubricating-receiving nipples or fittings of the kind illustrated in Bulletin 111 of the Lincoln

Engineering Co. of Missouri, and exemplified by Defendant's Exhibit A-53 and by Plaintiff's Exhibits 27a and 27b herein, or any similar device or devices embodying the invention of claim 2 of Butler patent No. 1,593,791, and any such nipples or fitting parts adapted or intended to be used in combinations embodying the invention described in claim 2 of said patent, and from offering or advertising so to do, and from aiding or abetting, or in any way contributing to, the infringement of said claim of said patent.

(22) The District Court erred in finding and decreeing, in effect, that plaintiff is entitled to recover from defendant-petitioner the profits which said defendant-petitioner has made, and the damages which plaintiff has suffered by reason of the said defendant-petitioners alleged infringement of the Butler patent in suit, and to recover its costs and disbursements of this proceeding.

637 (23) Wherefore said defendant-petitioner prays that the decree of the District Court[13] and the aforesaid order of the District Court be reversed.

Lincoln Engineering Co. of Illinois,
By Wilkinson, Huxley, Byron & Knight,
Attorneys for Defendant-Petitioner.

Delos G. Haynes,
Leonard L. Kalish,
Counsel for Defendant-Petitioner.

Entered Oct. 26, 1936.

638 And afterwards, to wit, on the 26th day of October, 1936, being one of the days of the regular October term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable Walter C. Lindley, District Judge appears the following entry, to wit:

639 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

ORDER ALLOWING APPEAL.

On this day came defendant-petitioner, Lincoln Engineering Co. of Illinois, by its attorneys, and presented its petition for appeal and its so-called assignment of errors herein.

Upon consideration thereof, but without approving the sub-

[13] that one of the two decrees of the District Court (of August 28, 1936 and of October 5, 1936) which may be its effective decree.

stance or propriety of the said assignment of errors, it is now ordered and adjudged that said petition for appeal and assignment of errors be considered as duly filed; that an appeal to the United States Circuit Court of Appeals for the Seventh Circuit be and the same is hereby allowed to said defendant-petitioner in accordance with its aforesaid petition for appeal, upon giving bond in the sum of $1,000.00 as security for the costs of this appeal; that a citation to plaintiff issue forthwith in due form as provided by law; and that so much of the transcript of the record herein as is necessary and essential to a proper presentation thereof be transmitted in due course to said United States Circuit Court of Appeals for the Seventh Circuit.

Walter C. Lindley,
United States District Judge.

October 26th, 1936.

640 And on, to wit, the 26th day of October, 1936, came the Defendant by its attorneys and filed in the Clerk's office of said Court a certain Bond on Appeal in words and figures following, to wit: Filed Oct. 26, 1936.

641 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—13955) * *

BOND.

Know All Men By These Presents, that the undersigned, Lincoln Engineering Co. of Illinois, as principal, and Massachusetts Bonding and Insurance Company of Boston, Massachusetts, a Massachusetts corporation, as surety, are firmly held and firmly bound unto Stewart-Warner Corporation in the full and just sum of one thousand ($1,000.00) dollars to be paid to Stewart-Warner Corporation, its successors or assigns, to which payment well and truly to be made, we bind ourselves and our successors and assigns jointly and severally by these presents.

Seal with our seals and dated this thirteenth day of October, 1936.

Whereas, lately in the District Court of the United States for the Northern District of Illinois, Eastern Division, in a suit

pending in said Court between said Stewart-Warner Corporation, plaintiff and John R. LeVally and Frederick A. Faville, doing business as Lincoln Engineering Company of Illinois, and Lincoln Engineering Co. of Illinois, defendants, a decree was rendered in favor of said Stewart-Warner Corporation and against the said last-named defendant which has filed a petition for appeal to reverse said decree.

642 Now, the condition of the above obligation is such that if the said Lincoln Engineering Co. of Illinois, defendant, shall prosecute its said appeal to effect, and answer all damages and costs if it fails to make good its appeal, then the above obligation is to be void, else to remain in full force and virtue.

Seal and delivered in the presence of:

Lincoln Engineering Co. of Illinois,
(Corporate seal) *Principal,*
By John M. Walhor,
President.

Attest:
S. D. Flime,
Secretary.

Massachusetts Bonding and Insurance Co.,
(Corporate seal) *Surety,*
By James F. Flaherty, (Seal)
Attorney-in-fact.

Attest:

_____
Secretary.

Approved Oct. 26th, 1936.
Walter C. Lindley,
United States District Judge.

643 And afterwards, to wit, on the 5th day of November, 1936, being one of the days of the regular November term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable Walter C. Lindley, District Judge appears the following entry, to wit:

644 IN THE DISTRICT COURT OF THE UNITED STATES. Entered Nov. 5, 1936.
* * (Caption—13955) * *

November 5, 1936.

Present: Honorable Walter C. Lindley, Judge of said Court.

On motion of defendant's attorney
It Is Ordered that the time for serving and filing Praecipe be and the same is hereby extended to and including November 9, 1936 at 10 A. M., and time for lodging Narrative Statement of Evidence be and the same is hereby extended to and including November 16, 1936 at 10 A. M.

645 And afterwards, to wit, on the 25th day of November, 1936, being one of the days of the regular November term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable James H. Wilkerson, District Judge appears the following entry, to wit: Entered Nov. 25, 1936.

646 IN THE DISTRICT COURT OF THE UNITED STATES.
* * (Caption—13955) * *

November 25, 1936.

Present: Honorable James H. Wilkerson, Judge of said Court.

On stipulation of the parties to this suit filed herein
It Is Ordered that the time to docket appeal and file Transcript of Record in United States Circuit Court of Appeals be and the same is hereby extended to and including December 5, 1936.

647 And on, to wit, the 9th day of November, 1936, came the Defendant by its attorneys and filed in the Clerk's office of said Court a certain Praecipe for Record in words and figures following, to wit:

ed Nov. 9, 1936.

648 IN THE UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

DEFENDANT-APPELLANT'S PRAECIPE.

To the Clerk of the Above-Named Court:

You are hereby respectfully requested to prepare a transcript of the record to be filed in the United States Circuit Court of Appeals for the Seventh Circuit, pursuant to an appeal allowed to defendant-appellant, in this cause, and to include in such transcript the following papers, records, exhibits, or portions thereof; in each instance omitting or abbreviating the caption, and making such other abridgments as are required by or permissible under the statutes and rules:

No.	Approximate Date	Document
	1934	
1.	June 27	Plaintiff's Bill of Complaint, Including Butler Patent in Suit.
2.	Aug. 1	Order Extending Time.
3.	Aug. 1	Defendants' Motion for Bill of Particulars.
4.	Aug. 14	Defendants' Answer.
5.	Aug. 20	Plaintiff's Bill of Particulars.
	1935	
6.	May 10	Order Granting Leave to File Supplemental Bill of Complaint.
7.	May 10	Plaintiff's Supplemental Bill of Complaint.
649 8.	May 28	Corporate Defendant's Motion for Bill of Particulars.
9.	May 28	Plaintiff's Amended Bill of Particulars.
10.	May 29	Plaintiff's Interrogatories.
11.	June 3	Defendant's Answer to Supplemental Bill of Complaint.
12.	June 13	Answers of Defendant John R. LeVally to Plaintiff's Interrogatories One and Two.
13.	June 13	Answers of Defendant Frederick A. Faville, to Plaintiff's Interrogatories Three and Four.
14.	June 13	Answers of Frederick A. Faville, President of Lincoln Engineering Co. of Illinois, to Plaintiff's Interrogatories Five and Six.
15.	July 8	Order Granting Plaintiff Leave to File Amended Bill of Complaint.

16. July 8 Plaintiff's Amended Bill of Complaint.
17. July 22 Defendants' Answer to Plaintiff's Amended Bill of Complaint.
18. August 19 Order Granting Defendants Leave to File Amendment to Its Answer.
1936
19. August 19 Amendment to Defendants' Answer.
20. Condensed (Narrative) Statement of Evidence (Testimony.)
21. July 15 Opinion at Final Hearing; Findings of Fact; and Conclusions of Law.
22. August 28 Decree.
23. October 5 Plaintiff's Motion to Vacate Decree Entered August 28, 1936.
650 24 Oct. 5 Order Vacating Decree of August 28, 1936.
25. Oct. 5 Decree.
26. Oct. 26 Corporate Defendant's Petition for Appeal.
27. Oct. 26 Corporate Defendant's Assignment of Errors.
28. Oct. 26 Order Allowing Appeal.
29. Oct. 26 Defendant's Bond for $1,000.00.
30. Oct. 26 Citation to Plaintiff re Appeal.
31. All Orders Subsequent to October 26, 1936, Extending Times.
32. Order re Condensed (Narrative) Statement of Evidence.
33. This Praecipe.
34. The Following Exhibits to be Reproduced in the Printed Transcript of Record:

Plaintiff's Exhibits (4 already included in Item 1), 10, 11, 28 and 54.

Defendants' Exhibits A-3, A-7, A-34, A-38, A-42, A-45, A-48, A-49, A-50, A-51, A-52 (inside front cover only), A-53, A-58, A-63, A-64, A-65, A-66, A-67, A-69, A-70, A-71, A-72, A-76, A-77, A-78, A-79, A-80, A-81, C-3, C-17, C-18, C-19, C-24.

35. The Following Exhibits to be Included and Transmitted as Physical Exhibits (Without Reproduction in the Printed Transcript of Record):

No.	Approximate Date	Document
651	(35)	Plaintiff's Exhibits 1, 2, 3, 5, 6, 7, 8, 9A, 9B, 9C, 9D, 12A, 12B, 12C, 13, 14, 15, 16, 17, 18, 19, 20, 21A, 21B, 21C, 22, 23, 24, 25, 26, 27A, 27A1, 27A2, 27B, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 40A, 41, 42, 43, 44, 45, 45A, 45B, 46A,

46B, 46C, 47, 48, 49, 50, 51, 52A, 52B, 52C, 52D, 52E, 52F, 52G, 52H, 52I, 52J, 52K, 52L, 52M, 52N, 52O, 52P, 53, 55, 56, 57, 58, 59, 60, 61, 62, 62A, 62B, 62C, 63, 63A, 63B, 64, 65, 66, 66A, 67, 67A, 67B, 68A, 68B, 68C, 68D, 68E, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81A, 81B, 82, 83, 84.

Defendants' Exhibits A-1, A-2, A-4, A-5, A-6, A-8, A-9, A-10, A-11, A-12, A-13, A-14, A-15, A-16, A-17, A-18, A-19, A-20, A-21, A-22, A-23, A-24, A-25, A-26, A-27, A-28, A-29, A-30, A-31, A-32, A-33, A35, A-36, A-37, A-39, A-40, A-41, A-43, A-44, A-46, A-47, A-52, A-54, A-55, A-56, A-57, A-59, A-60, A-61, A-62, A-68, A-73, A-74, A-75, C-21.

36. Clerk's Certificate.

If plaintiff has filed or hereafter files a praecipe under the rules, to include any of the following items which are hereinbelow numbered 37 to 54 inclusive, then the clerk will please include each and all of said items 37 to 54 inclusive and as follows:

652 Approximate

No.	Date 1936	Document
37.	Sept. 5	Defendant's Petition for Rehearing.
38.	Sept. 5	Order to Show Cause.
39.	Sept. 5	Defendants' Exhibit A-82 (to be transmitted as a physical exhibit in two volumes).
40.	Sept. 12	Transcript of Proceedings Before Court (to be transmitted physically only).
41.	Sept. 12	The Annexed Extracts from said Transcript (to be reproduced in the printed Transcript of Record).
42.	Sept. 17	Affidavit of Benjamin F. Wupper in Opposition to Defendant's Petition for Rehearing.
43.	Sept. 17	Plaintiff's Exhibit 85 (to be transmitted only as a physical exhibit).
44.	Sept. 25	Rebuttal Affidavit of Leonard L. Kalish dated September 24, 1936, in Support of Defendant's Petition for Rehearing.
45.	Sept. 25	Affidavit of John W. McNair dated September 23, 1936.
46.	Sept. 25	Defendants' Exhibits A-83, A-84 (physical)
47.	Sept. 25	Defendant's Amendment or Supplement to Its Petition for Rehearing and Verifying Affidavits of Leonard L. Kalish dated September 24, 1936.
48.	Sept. 25	Defendants' Exhibits A-85 and A-86 (to be reproduced in the printed Transcript of Record).

49. Sept. 28 Affidavit of James Challis dated September 27, 1936.

50. Sept. 28 Affidavit of John W. McNair dated September 27, 1936, made for purpose of correcting typographical error in his earlier affidavit dated September 23, 1936.

653 51. Sept. 28 Corrected Affidavit of John W. McNair dated September 27, 1936.

52. Sept. 28 Supplemental Affidavit of Leonard L. Kalish dated September 27, 1936.

53. Sept. 28 Defendants' Exhibit A-87 (to be reproduced in the printed Transcript of Record).

54. Oct. 5 Findings of Fact, Conclusions of Law and Order of Court Upon Defendant's Petition for Rehearing.

If plaintiff has filed or hereafter files a praecipe under the rules, to include any of the following items which are numbered hereinbelow 55 to 63 inclusive, then the clerk will please include each and all of said items 55 to 63 inclusive and as follows:

No.	Approximate Date 1936	Document
55.	Sept. 8	Defendant's Motion for Supersedeas.
56.	Sept. 8	Affidavit of Delos G. Haynes re the Above.
57.	Sept. 12	Transcript of Proceedings Before the Court on September 12, 1936 (to be transmitted physically only) (this is the same as item 40 above).
58.		The Annexed Extracts from said Transcript of Proceedings of September 12, 1936 (to be reproduced in printed Transcript of Record).
59.	Sept. 12	Order Granting Supersedeas.
60.	Oct. 26	Corporate Defendant's Motion for Supersedeas.
654 61.	Oct. 26	Transcript of Proceedings Before the Court on October 26, 1936 (to be transmitted physically only).
62.	Sept. 26	Oral Opinion re Defendant's Motion for Supersedeas; forming a part of foregoing Item 61 (to be reproduced in printed Transcript of Record).
63.	Oct. 26	Order Denying Defendant's Motion for Supersedeas.

Wilkinson, Huxley, Byron and Knight,
Attorneys for the Corporate Defendant.

November 8, 1936.

AFFIDAVIT OF SERVICE.

State of Missouri, } ss.
City of St. Louis. }

FLORENCE STONES, being duly sworn, deposes and says that on the eighth day of November, 1936, she sent by registered mail to Messrs. Williams, Bradbury, McCaleb and Hinkle, attorneys for Plaintiff, at 2300 Board of Trade Building, Chicago, Illinois, one copy of the foregoing Praecipe of Defendant-Appellant.

Florence Stones.

Sworn to and subscribed before me this eighth day of November, 1936. My commission expires June 24, 1938.

T. Louise Kelley,
(Notarial Seal) *Notary Public.*

655 IN THE UNITED STATES DISTRICT COURT.
* * (Caption—13955) * *

ITEM 41 IN THE FOREGOING PRAECIPE.

Extracts from Transcript of Proceedings before the Court on September 12, 1936:

(Referring to the invalidating of Butler claim 2 by the U. S. District Court in the Western District of Pennsylvania which was relied upon, in part, by defendant in its motion for supersedeas:)

"The Court: That ground I shall not consider. I have considered this patent and those decisions, and I shall not again consider the validity. Having come to my decision, I shall let it stand. You may ignore that part of your grounds."

* * * * * *

(Referring to the scheduled oral hearing on Defendant's Petition for Rehearing which had theretofore been fixed for September 28, 1936 by the Court's Order to Show Cause of September 5, 1936:)

"The Court: I do not intend to hear any oral argument on the 28th. You gentlemen may submit your written memorandums on the petition for rehearing. I don't intend to hear any oral arguments on the 28;".

656 IN THE UNITED STATES DISTRICT COURT.
* * (Caption—13955) * *

ITEM 58 IN THE FOREGOING PRAECIPE.

Extracts from Transcript of Proceedings before the Court on September 12, 1936:

"Mr. D. G. Haynes:

"May it Please the Court, this is a motion by the corporate defendant, Lincoln Engineering Co. of Illinois, for a supersedeas of the injunctive portion of your Honor's decree of August 28th. in this case. The portion of which we seek a supersedeas is that portion directing that an injunction be issued, which would apparently stop sales of the so-called Lincoln Kleenseal fittings, whether sold in connection with or for use with the Alemite Hydraulic coupler, or whether sold for use with the couplers not complained of in this suit.

We base this motion upon the facts, first, that the moving defendant, on September 5, filed a petition for a rehearing, on which your Honor entered an order to show cause, returnable on September 28. Second, that the patent claim on which the injunction is premised, has been held invalid in two suits in the District Court for the Western District of Pennsylvania, which our motion identifies.

657 "The Court: That ground I shall not consider. I have considered this patent and those decisions, and I shall not again consider the validity. Having come to my decision, I shall let it stand. You may ignore that part of your grounds.

"Mr. Haynes: We did not intend to urge that point at all on this motion for supersedeas, but merely call attention to it to show that there is a divergence of opinion. Third, that the continuance of the injunction is causing irreparable injury to the moving party. Fourth, that the grant of this motion will cause no damage to the Plaintiff because the Defendant is ready to furnish a bond in a sum to be determined by the Court.

"As proof of the third point, as throwing some light upon the moderate volume of business involved in this fitting, I would like to take the testimony of Mr. John R. LeVally, for about five minutes.

"The Court: What do you expect to prove by it?

"Mr. Haynes: I expect to prove by his testimony that he

is the Vice-President of the corporate defendant. He has figures with him, showing that the approximate volume of sales of the Lincoln Kleenseal fitting, by the Lincoln Engineering Co. of Illinois for the six months ending with August, 1936, have been a total of $570.00. He will testify that the principal part of his Company's business is the sale of Lincoln compressors, guns, and other things, not at all complained of in this suit, and that this small business of Lincoln Kleenseal fittings is a necessary aspect of the major part of his business, not at all complained of in this suit.

658 What I am interested in is merely to throw some light on what would be an equitable figure for the bond.

"The Court: Do you dispute those facts?

"Mr. Williams: I will agree that the testimony of Mr. LeVally would be as Mr. Haynes has stated, and his statement may be accepted as read."

* * * * * *

"The Court: I am going to modify this. I have modified it to read as follows: 'It is ordered, adjudged and decreed that the injunction heretofore ordered be recalled and issuance of injunction be stayed, until this Court's decision on said Defendant's pending petition for rehearing.' I am going to do that without bond."

Filed Nov. 19, 1936.

659 And on, to wit, the 19th day of November, 1936, came the Plaintiff by its attorneys and filed in the Clerk's office of said Court a certain Supplemental Praecipe for Record in words and figures following, to wit:

660 UNITED STATES DISTRICT COURT.

* * (Caption—13955) * *

PLAINTIFF'S SUPPLEMENTAL PRAECIPE FOR RECORD ON APPEAL.

To the Clerk of the above-named Court:

An appeal having been allowed the defendant, Lincoln Engineering Co. of Illinois, and a praecipe for record on appeal having been filed by said defendant's counsel, now comes plaintiff and requests that the following additional exhibits be printed in the record on appeal:

Plaintiff's Exhibits to be printed (In addition to those called for by Defendant's Praecipe):

1. Articles of Incorporation of The Bassick Manufacturing Co.
2. Certified copy of Change of Name to Alemite Corporation.
3. Certified copy of Articles of Incorporation of Stewart-Warner Speedometer Corporation, and Certificate of Change of Name to Stewart-Warner Corporation.
5. Assignment to Cincinnati Ball Crank Company of Butler Patent No. 1,593,791.
6. Assignment from Cincinnati Ball Crank Company to Alemite Corporation of Butler Patent No. 1,593,791.
661 7. Assignment from Alemite Corporation to Stewart-Warner Corporation of Butler Patent No. 1,593,791.

(If the defendant files an acknowledgment or enters into a stipulation with plaintiff in a form satisfactory to plaintiff's counsel with respect to the incorporation of the plaintiff and title to the patent in suit, the printing of the foregoing documents may be dispensed with.)

34. Drawing of Alemite Hydraulic Coupler in Combination with Alemite Hydraulic Fitting.
35. Drawing of Alemite Needle Type Hydraulic Coupler with Alemite Fitting.
36. Drawing of Alemite Coupler in Combination with Lincoln Fitting.
37. Drawing of Alemite Needle Type Hydraulic Coupler in Combination with Lincoln Fitting.
38. Drawing of Small Hydraulic Compressor and Nozzle, identified by Cornell, in Combination with Lincoln Fitting.
39. Drawing of New Type Alemite Hydraulic Compressor and Nozzle in Combination with Lincoln Fitting.
43. Tabulation Showing Sales of Guns from Lincoln Engineering Company to Bassick and Alemite.
45. (a) General Motors Standard Sheet, page R-4, showing Type C Alemite Hydraulic Fittings;
(b) General Motors Standard Sheet, page R-5, showing Alemite Hydraulic Fittings.
46. (a) General Motors Standard Sheet, page R-6, showing Type D Lincoln Kleenseal Fittings;
(b) General Motors Standard Sheet, page R-7, showing Type D Lincoln Kleenseal Fittings;
(c) General Motors Standard Sheet, page R-8, showing Type D Lincoln Kleenseal Fittings.
47. General Motors Blueprint No. 109,461, showing Straight-Sided Fitting.

48. General Motors Blueprint showing Angle Type Straight-Sided Fitting.

49. General Motors Standard Sheet, page R-10, showing Alemite and Lincoln Guns and including the paragraph about patent liability.

52. (a) Automotive Journal Motor Row and Garage Dealer, August, 1933, page 30.

(b) Implement and Tractor Trade Journal, March 24, 1934, page 21.

662 52. (c) National Petroleum News, July 12, 1933.

(d) Bus Transportation, July, 1933.

(e) National Petroleum News, March 7, 1934, page 71.

(f) Farm Implement News, January 18, 1934, page 8.

(g) Implement and Tractor Trade Journal, January 27, 1934, page 23.

(h) Detroit Supercharger, January, 1934.

(i) Lubrication Maintenance, July, 1933.

(j) Petroleum Age and Service Station Merchandising, July, 1933.

(k) Motor West, October, 1933.

(l) Automotive Merchandising, September, 1933.

(m) Automotive Journal Motor Row and Garage Dealer, August, 1933.

(n) Automotive Daily News, November 29, 1933.

(o) Automobile Topics, December 30, 1933.

53. Letter written by Barks of Lincoln Engineering Company to J. E. Otis.

55. Emasculated drawing of Figure 2 of Butler patent.

56. Enlarged photograph of Richardson fitting.

57. Enlarged photograph of physical model of Richardson.

58. Composite photograph of the fitting shown in the patent drawing superimposed on the photograph of the physical model.

69. Enlarged portions of General Motors standards sheet.

70. Enlarged portion of General Motors standards sheet.

76. Sketch made in court by Williams, Jr.

Please also print this Supplemental Praecipe.

Lynn A. Williams,
Williams, Bradbury, McCaleb & Hinkle,
Solicitors and Counsel for Plaintiff.

Receipt of a copy of the foregoing Supplemental Praecipe acknowledged this 19th day of November, 1936.

Wilkinson, Huxley, Byron & Knight,
Solicitors for Defendant.

464

July 27, 1928.

1,593,791

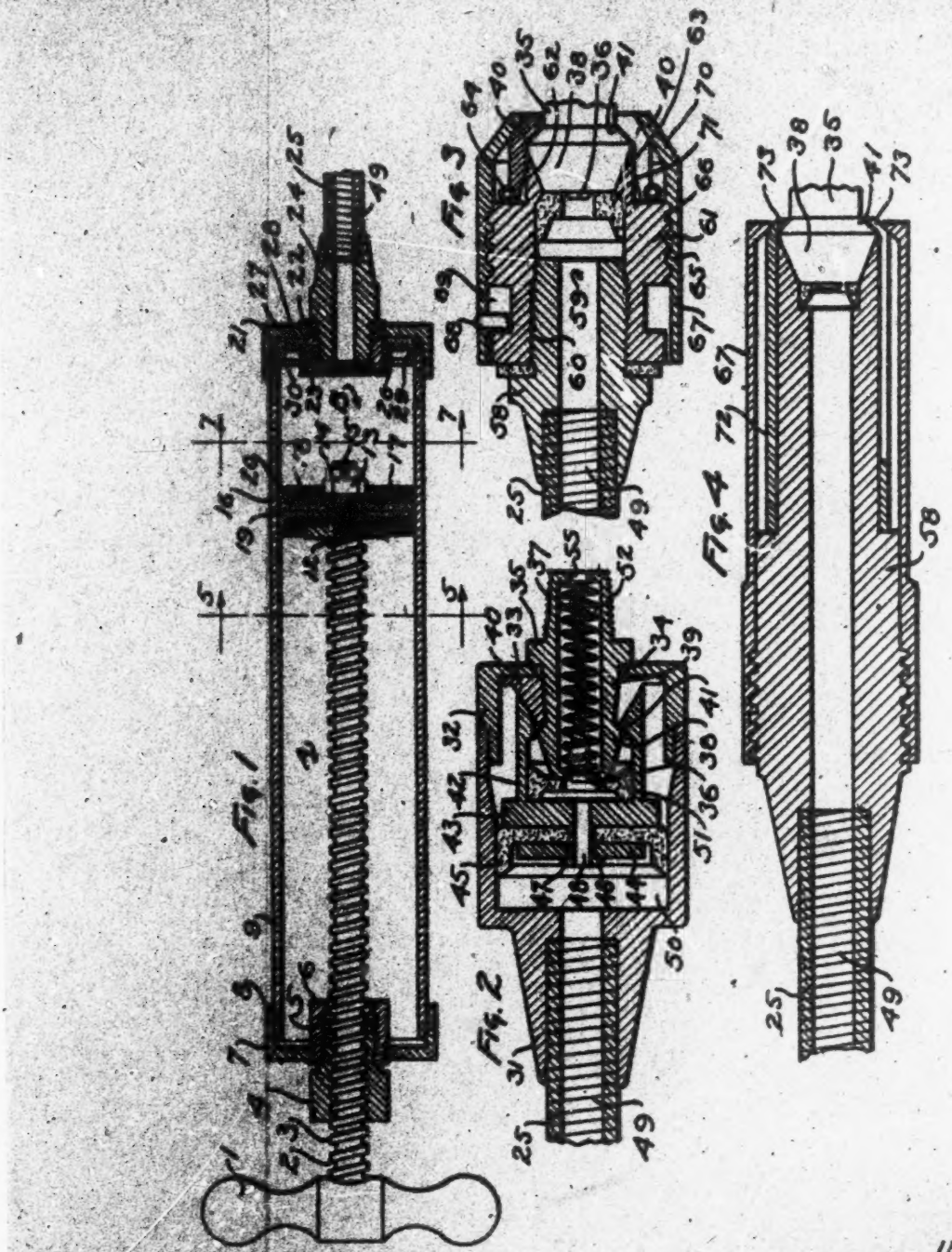
464

C. G. BUTLER

LUBRICATING APPARATUS

Filed Feb. 19, 1923

2 Sheets-Sheet 1



INVENTOR

BY Clyde G. Butler.
Goulmin & Goulmin.

ATTORNEY

466

July 27, 1926. 1,593,791

C. G. BUTLER

LUBRICATING APPARATUS

Filed Feb. 19, 1923 2 Sheets-Sheet 2

Fig. 5

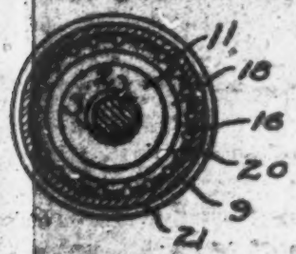


Fig. 9

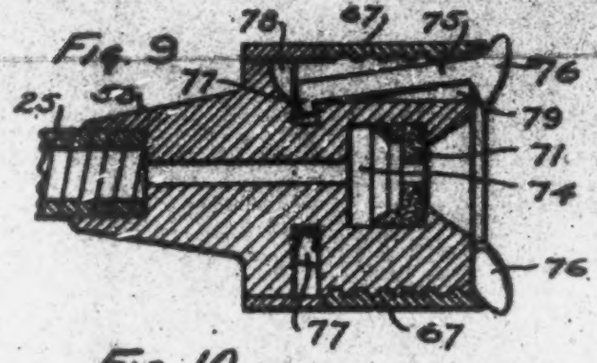


Fig. 6

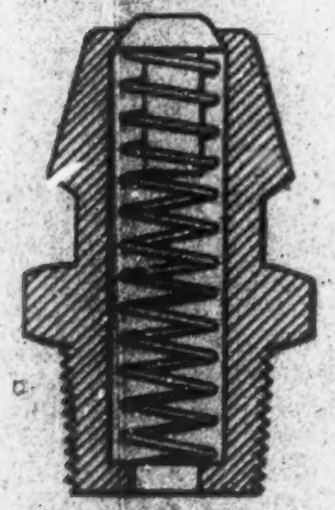


Fig. 10

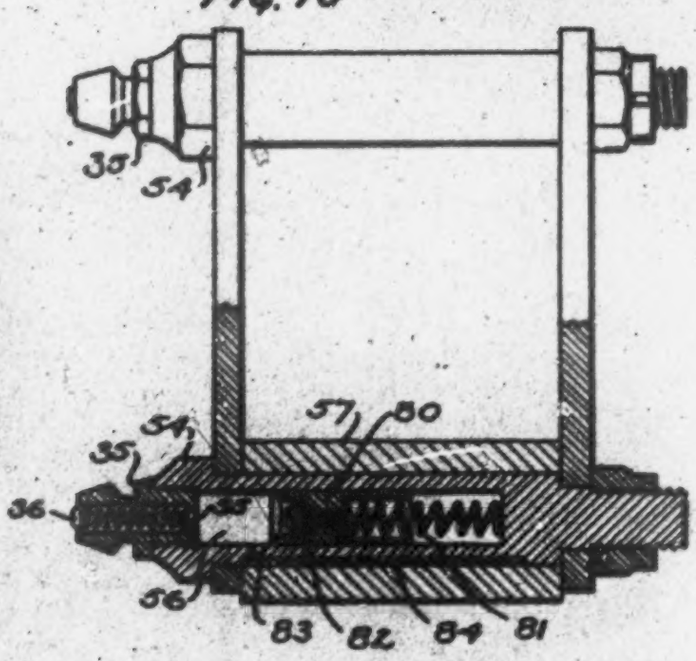
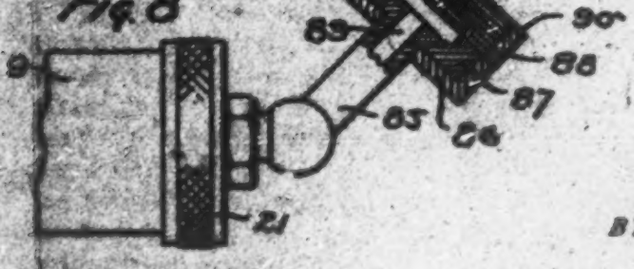


Fig. 7

Fig. 8



INVENTOR

Clyde G. Butler

BY Faulkner & Faulkner

ATTORNEY

Patented July 27, 1926. 1,593,791

467

UNITED STATES PATENT OFFICE.

CLYDE G. BUTLER, OF DAYTON, OHIO.

LUBRICATING APPARATUS.

Application filed February 19, 1923. Serial No. 619,909.

My invention relates to lubricating apparatus and in particular to a force feed lubrication for bearings and the like in automotive equipment and similar mechanism, and also relates to a method of lubrication.

It is my object to provide a means of forcing under high pressure fluid and semi-fluid lubricating compounds into bearings and into bearing reservoirs in order that foreign material and used lubricant therein may be forced out of the bearing or out of the bearing reservoir. It is my object to provide a cooperating bearing and self sealing bearing lubricating valve. It is a further object to provide in combination with the self-sealing bearing valve a bearing reservoir for lubricant and means for automatically feeding the lubricant therefrom to the bearing.

It is a further object of my invention of providing automatic and semi-automatic means of connection between the bearing valve and the lubricating pressure means or grease gun so-called.

It is a further object to provide either a flexible connection between the bearing valve and the grease gun or a rigid connection, both of said connections being susceptible of being positioned in any desired place relative to one another in order to accommodate for the location in restricted areas of the bearing and bearing valves.

It is a further object of my invention to provide a self-refilling grease gun which is adapted to draw the grease or other lubricant into it without the necessity of using a paddle or other means of drawing the grease into the gun or placing it in the gun.

It is a further object to provide such a gun so constructed that it will draw the grease through the restricted aperture through which it passes when being forced into the bearings.

It is an additional object to provide a self-sealing gun in order that the joint between the head of the gun and the barrel thereof will be automatically self-sealing, the joint becoming tighter the greater the pressure.

It is an additional object to provide a self-sealing piston. It is an additional object to provide a piston head that will not rock upon the piston and will not strip therefrom under the pressure.

It is an additional object to provide a grease gun which will have the piston adapted to be advanced slowly but which may be retracted quickly for recharging or other purposes.

It is a further object of my invention to provide automatic and semi-automatic connections between the grease gun and the bearing valve which may or may not be locked in position as desired by the operator or may be automatically locked.

It is a further object to provide in the lubricating valve a broad bearing for the valve member as distinguished from a bearing consisting of merely a single point of contact as in the case of a ball. It is a further object to provide a valve member which will seat itself automatically. It is a further object to provide a valve member which may be readily located in its seat by the yielding means and will not be upset.

It is a further object to provide a valve member which will readily allow the lubricant to pass thereby but will be of such design that any accumulation of foreign material will not prevent it from seating or will not disturb it with relation to the resilient means which supports it to seat it.

Referring to the drawings:

Fig. 1 is a section through the grease gun with the piston and handle in full lines;

Fig. 2 is a section through a portion of the flexible coupling, the chuck, and the bearing valve showing a semi-automatic chuck;

Fig. 3 is a similar view showing a modified form of the chuck;

Fig. 4 is a similar view showing an elongated type of spring finger chuck;

Fig. 5 is a section on the line 5—5 of Fig. 1, looking in the direction of the arrow, viewing one end of the piston head;

Fig. 6 is a detail of the bearing valve, partially in section;

Fig. 7 is a section on the line 7—7 of Fig. 1, looking in the direction of the arrows, showing a plan view of the self-sealing end of the grease gun;

Fig. 8 is an elevation with the joint partially in section of the rigid connection between the grease gun and bearing valve;

Fig. 9 is a section of a modified construction of chuck for connecting the grease gun to the bearing valve;

Fig. 10 is a view partly in section of a bearing and shackle links showing the bearing valve installed, the bearing reservoir and the automatic means for self-feed of lubricant from the reservoir to the bearing.

Referring to the drawings in detail, 1 is a handle mounted on a piston 2 having threads 3 thereon constituting a worm. This worm travels in an internally threaded guide or nut 4 that is externally threaded at 5. 4 is therefore threaded into an internally threaded collar 6 permanently held in the head 7 of the grease gun. This head is threaded at 8 upon the barrel 9 of the gun proper. Within the barrel 9 travels the rod 2 on one end of which is threaded a collar 10 having a shoulder 11. This collar is seated upon the rod 2 as at 12. It will be observed that at 12 there is a shoulder cut into two, to prevent the pressure pushing 11 and 10 back along the rod 2 and preventing 10 and 11 from rocking or upsetting. 11 is firmly engaged against the shoulder 12 by reason of the nut 13 which is castellated at 14 and held in position by a small cotter pin 15. Between 11 and 13 are located the following, a spring washer having a plurality of bent up spaced teeth, the washer being designated 16 and the teeth 17, a plain washer 18, and a pair of diverging leather washers 19 having diverging sealing portions 20. The spring washers 16 with their spring teeth 17 serve to keep the leather washers 19 in engagement with the walls of the cylinder 9, thus sealing the grease gun. The several washers and leather members are embraced between 11 and 13 and maintained rigidly at right angles to the lateral movement of the whole piston head thus formed as it moves laterally.

By maintaining such a seal and by the use of the worm, I am enabled to secure pressure up to 1500 pounds within this gun.

One of the difficulties inherent in former grease guns has been the leaking around the head of the gun and the difficulty of properly sealing this head.

In the case of my invention it is unnecessary to remove this head and because of the very tight seal secured by the piston head just described, I am enabled to draw in the lubricant into the cylinder in area B, yet if it is desired to remove this head in my construction it can be done and restored without destroying the seal.

The head consists of an outside internally threaded collar 21 in which there is centrally located permanently a collar 22 having an internally threaded inward projection 23. There is threaded into this the coupling head 24 which supports the coupling hose 25.

It will be understood that this hose may be either flexible or rigid as in Fig. 8.

Surrounding [illegible] a closely fitting collar 26 having a shoulder 27 which engages with a leather washer 28 resting against the inside of 21 between 22 and 21 and having an upwardly extending portion 29 beveled on the interior thereof at 30.

It will be seen that when the grease is under pressure in area B that it will force down the shoulder 27 upon the washer 28 against 21 and will also force outwardly 29 against the wall of the cylinder 9. The greater the pressure the more perfect will be the seal in this head thus preventing the escape of lubricant.

When it is desired to quickly retract the piston head and the piston rod the nut 4 is retracted out of 6 thus allowing the air in area A to escape as the piston is withdrawn quickly but the seal being perfect between the barrel 9 and the piston head a vacuum is created in B and if the grease gun has its coupling 25 immersed at the end in lubricant the lubricant will be drawn through 25, 24, into B, thus automatically filling the grease gun without the necessity of taking off the head and forcing the grease in by a paddle or other means which is customary in the present state of the art.

Proceeding to the description of the apparatus employed in connection with the practice of the rest of my method, the coupling 25 has mounted on the outer end thereof a head 31. The outer end of this head has internally threaded therein a collar 32 having a turned-in portion 33 with an aperture 34 through which projects the valve member 35 in which is located a valve 36 maintained in position against the seat by a spring 37, the axle of which will be hereinafter described. This member 35 is composed generally of two parts, a conical head proper 38 and a restricted portion or throat 39. A plurality of segments 40 slightly spaced from one another are adapted to slip over the head 38 and embrace the slot 39. The shoulder 41 on 38 prevents the retraction of these segments 40 due to the fact that they are held in position on the throat by the spring fingers 42, a plurality of which are mounted upon a base 43 which forms a part of a piston head that consists of 43, a metallic washer 44 embracing between it and 43 a leather sealing washer 45. This union of the parts 45, 44 and 43 is effected by 43 having a tubular member 46 projecting through 45 and 44 and bent over at 47 upon 44. A passage way 48 is left through 46 for the passage of lubricant. The lubricant comes through the tubular member 25 through the passage way 49 into the expanded area 50 within 31. The area 50 will fill up with lubricant because the delivery of lubricant to 50 will be at a greater rate than the lubricant can pass through 48. This will result in 44, 45 and 43, together with the fingers 42, being forced forwardly, maintaining the segments 40 in close engagement with 39. The washer 51 provides a ready means of adjusting the junction of 38 with the remainder of the mechanism and effectively seals the connection so that the lubricant will pass through

48 into 52 after having pushed back the rivet or stud 36. This rivet or stud is held in position by the spring 37 yieldingly and cannot upset due to the fact that its shaft 53 projects into the coil of the spring 37.

It will be understood that 35 is threaded into the bearing as shown in Fig. 10 at 54. The aperture 55 permits the movement of the lubricant into the reservoir 56 in the buckle bolt or to any other suitable reservoir for lubricating the bearing. The spring member is shown at 57 riding upon the bolt 54.

Returning to Fig. 2 and its operation, it will be understood that the coupling on the end of 25 is thus pushed over 35, the segments 40 engage with the throat and are maintained in engagement by the pressure being greater on the piston within the coupling than any relief of the pressure that will be possible through the passage of the lubricant through 48.

As soon as the pressure is relieved it is then possible to withdraw the coupling from the member 35 as the pressure on the fingers 42 will be relieved and the spaced segments 40 will slip over the shoulders 41 due to the pressure of 33 against the ends of the several segments 40.

It will be seen that this coupling eliminates the necessity for a delicate adjustment by the operator of the coupling to the valve member which is often times difficult in restricted areas frequently found on automotive vehicles where this type of equipment is especially useful.

Referring to Fig. 3, 25 is the usual connecting member upon which is mounted a head 58. This head 58 has a passage way for the lubricant at 59 and is externally threaded at 60. A collar 61 is adapted to be threaded on 58 to engage with the threads 60. This collar has a cup-shaped outer end at 62 adapted to fit the conical head of 35 designated 38. 61 is cut away at its outer end to form a cylindrical member of smaller diameter than the rest of the body which is designated 63. On the exterior of this cylindrical member there are mounted a plurality of segments 40 and surrounding these segments, adapted to draw inner ends thereof towards 63, is a helical spring 64 thus constantly tending to keep the jaws formed by the segments 40 open for the reception of 38. The segments 40 are so designed that their inner ends they are tapered and at their outer ends they are bent over in the form of fingers to engage the shoulder 41 of 38.

61 carries a plurality of coarse threads 65 adapted to engage similar threads 66 on the interior of a collar 67. This collar carries a pin 68 traveling in a cutaway portion 69 in 61 to prevent 67 from being backed completely off of 61. The outer end of 67 is restricted into a conical shape as at 70 so that the inner surface of this restricted end will engage with a similar tapered surface of the members 40 adapted to force the outer of ends of 40 to engage with the shoulders 41 of 38 and thus lock this coupling to the valve member. Adjustments in size wear and position are provided for by the yielding washer 71 between 38 and 58.

Referring to Fig. 4, there will be seen a modification of this same principle of semi-automatic engagement of the coupling with the valve member. The fingers 72 are slightly separated from one another, have turned in ends 73 to engage with 41 of 38, and are adapted when not under compression to spring outwardly. The collar 67 is adapted to compress these spring fingers just as in Fig. 3. The head 58 is of somewhat similar construction. 67 is adapted to be threaded on 58. The parts are shown in somewhat different proportions in order to accommodate situations where a remote valve member necessitates a long, narrow coupling.

Referring to Fig. 9, the head 58 in Fig. 9 is provided with a chamber 74 in the head thereof in which is located the usual washer 71 for the accommodation for the size of the parts and their wear. The valve member is retained in engagement with the head by a plurality of loose fingers 75 having heads 76 to engage with the shoulder 41 and retaining ends or lugs 77 engaging in a groove 78 in 58. Each finger 75 travels in its respective slot 79 in 58. By threading the members 67 forward on 58 these outer ends of the fingers 76 are drawn together and thereby engage 38 by engagement with the shoulder 41 thereof.

Referring to Fig. 10, when the lubricant has been forced through 35 into 56 under great pressure it forces back the piston 80 against the spring 81 until 56 is completely filled. When the pressure is withdrawn 36 seals the reservoir and the lubricant therein is then subjected to pressure of the piston 80 with the spring behind it. 82 is the usual washer. The lubricant is therefore constantly under pressure and constantly being forced outwardly so that it passes out through a typical exit opening 83 into a lubricating channel 84 to lubricate the engagement of the bolt 54 and the remainder of the mechanism 57 thus constantly forcing fresh, clean grease into engagement with the parts and forcing outwardly the used lubricant or lubricant which may have become contaminated by foreign material getting into it.

In Fig. 8, I have shown my rigid form of coupling between the lubricant pressure apparatus and the chuck or union for connecting with the lubricant valve a member to be lubricated.

This construction consists of the lubricat-

ing apparatus having a chamber 9 with the head 21 to which is attached a tubular member 85 at an angle thereto. This tubular member has a passage therein designated 86. At the end of 85 is a plate 87. Surrounding 85 and beneath 86 is a collar 88 having a shoulder 89 and internally threaded at 90 to engage with a threaded head 91 of a second tubular member 92 attached at an angle to the shack 58 or any similar attaching member between the source of supply and the part to be lubricated. A washer 93 is interposed between 87 and 91 to seal the parts.

It will be seen from this arrangement that by loosening the collar the tubular members can be adjusted with respect to one another at varying angles so as to bring 58 and 9 parallel to one another or at varying angles to one another according to the position in which it is necessary to place the several parts in order to effect their lubrication from the source of supply to the part to be lubricated. This eliminates the flexible hose 25 where it is found inadvisable to employ it.

While I have shown and described certain features as constituting my invention, it will be understood that parts have been shown for purposes of illustration only, and that I do not desire to be limited to such details, as obvious modifications will occur to a person skilled in the art.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. The combination with a nipple for receiving lubricant, of a lubricant compressor having a coupling for connecting said compressor and nipple the coupling comprising a cylinder, a piston movable within the cylinder, and having an aperture for the discharge of lubricant therethrough and an apertured seat for engagement with the end of the nipple, and means carried by the cylinder for compressively engaging about the nipple for locking said parts together against longitudinal [illegible] actuated by said piston whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said means, while the lubricant is passing through said connecting parts.

2. The combination with a headed nipple for receiving lubricant, of a lubricant compressor having a coupling member for connecting said compressor and nipple comprising a cylinder, a piston movable within the cylinder, and having an aperture for the discharge of lubricant thereof, an apertured sealing seat carried by said piston for engagement with the end of the nipple, connecting the piston aperture with a passage through the nipple, radially movable locking elements carried by the cylinder coacting with the nipple and actuated by said piston for compressively clutching the elements upon the nipple whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said elements while the lubricant is passing through said connecting parts.

In testimony whereof, I affix my signature.

CLYDE G. BUTLER.

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No. 8,251.

PATENTED JULY 29, 1851.

A. RICHARDSON.

OIL CUP FOR JOURNAL BOXES.

Fig. 1

Fig. 2

UNITED STATES PATENT OFFICE.

AARON RICHARDSON, OF BELLOWS FALLS, VERMONT.

OIL-CUP FOR JOURNAL-BOXES.

Specification of Letters Patent No. 8,951, dated July 22, 1851.

To all whom it may concern:

Be it known that I, AARON RICHARDSON, of Bellows Falls, in the county of Windham and State of Vermont, have invented a new and useful Improvement in Oil-Cups for Lubricating the Journals or other Bearings or Rubbing Surfaces of Machinery; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a side view of one of the cups and Figs. 2, and 3, are vertical sections through the center.

Similar letters of reference indicate corresponding parts in each of the several figures.

My invention consists in providing the interior of the oil cup, with a valve, which fits in a seat around the mouth and is held there by a spring; serving to close the mouth of the cup and exclude dirt but yielding to the slightest pressure of the spout of an oil can or feeder, and allowing the oil or other lubricating material to be introduced; closing itself when the pressure is removed and forming in fact a self acting stopple.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A, represents the body of the cup which has a screw socket *a*, at its bottom, for the purpose of screwing it into the cap of a journal box, or any bearing in which it is to be used. Its external form may be any that is considered desirable, but its mouth *b*, is contracted or made smaller than the part of the inside below it, to form a valve seat.

B, is a spherical valve fitting within the valve seat *b*. Any other description of valve may be used but I consider this form the best as it will more readily find its place.

C, is a spiral spring within the cup. This and the valve are inserted through the bottom of the cup, and are kept in by a ring D, which is screwed into the bottom or socket *a*, and forms a bearing for the spring, which presses under the valve and causes it to keep the mouth *b*, closed (as shown in Fig. 2,) when it is not opened by some external or downward pressure.

The oil is fed into the cup by simply pressing the spout of the feeder (as shown in Fig. 3) upon the upper surface of the valve, which may or may not project above the mouth when closed, the spring requiring to be only strong enough to hold the valve in place, yields readily to the pressure, and allows the valve to descend sufficiently to admit the oil to the inside, and on the feeder being withdrawn it raises the valve and closes the entrance. A wick may be used within the cup if thought desirable to prevent the oil escaping too freely to the bearing.

This oil cup possesses one great advantage over the oil cup in common use, as many bearings are placed in such positions that when the machinery of which they form part is in motion, it is difficult to remove their stopples, while this may be opened by a long spouted feeder, where the hand could not reach. Another advantage is that it will be impossible to leave it open as is sometimes done by forgetfulness, to the detriment of machinery. For locomotive engines I consider it particularly well adapted, as it will exclude the dirt and dust which are so destructive, and will allow the engineer to oil his bearings with one hand while the engine is running.

I do not confine myself to any form of valve or spring, but

What I claim as my invention and desire to secure by Letters Patent, is—

The employment within the mouth of an oil cup of a valve B, operated upon by a spring C, or its equivalent in the manner and for the purpose substantially as herein described.

AARON RICHARDSON.

Witnesses:

JOHN N. BAXTER,

HENRY E. STOUGHTON.

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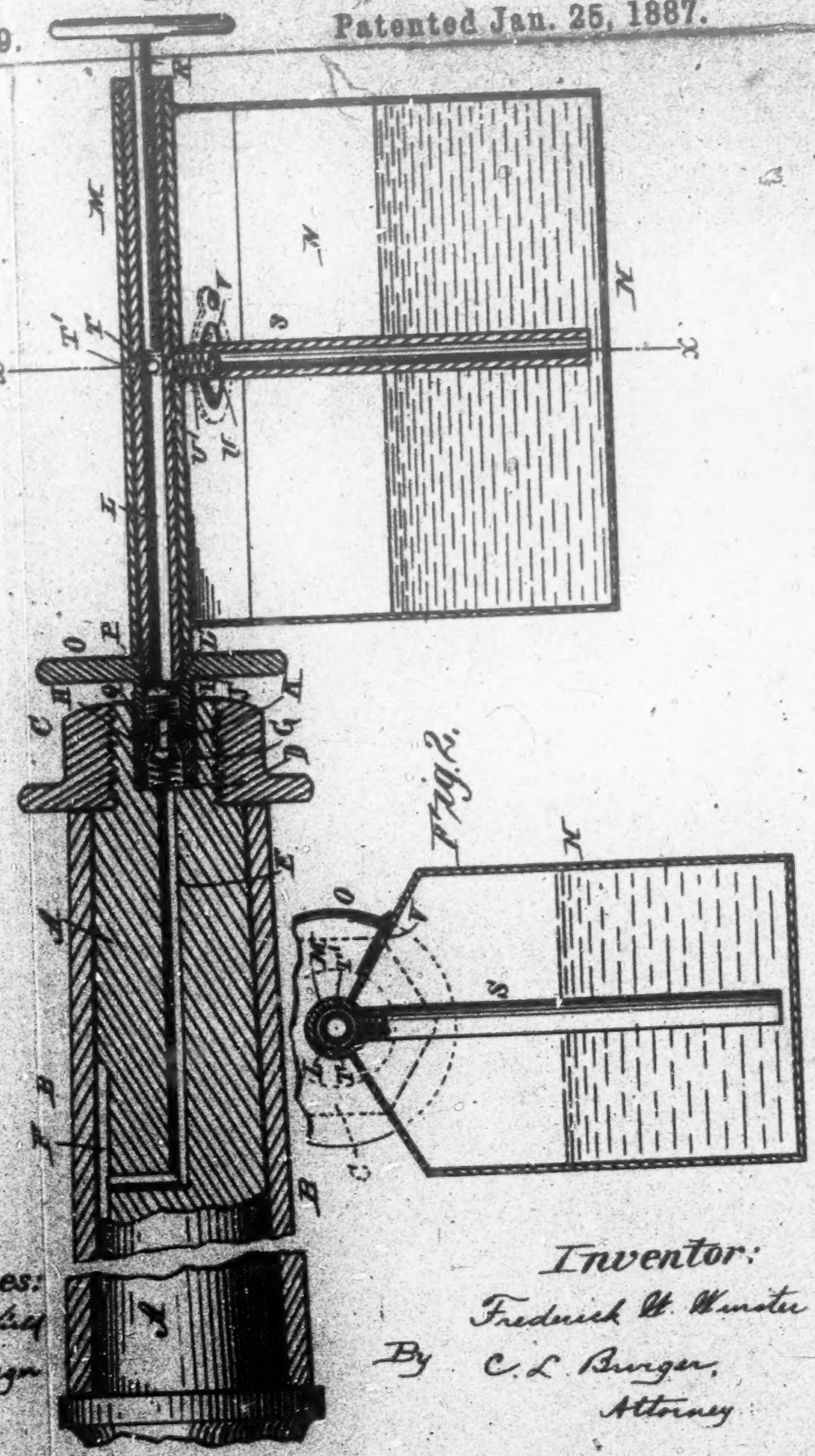
(No Model.)

F. W. WURSTER.

AXLE LUBRICATOR.

No. 356,519. Patented Jan. 25, 1887.



Witnesses:
J. P. Goofield
C. L. Burger

Inventor:
Frederick W. Wurster
By C. L. Burger,
Attorney

UNITED STATES PATENT OFFICE.

FREDERICK W. WURSTER, OF BROOKLYN, NEW YORK.

AXLE-LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 356,819, dated January 25, 1887.

Application filed October 27, 1886. Serial No. 217,304. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. WURSTER, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Axle-Lubricator, of which the following is a full, clear, and exact description.

My invention relates to that class of axle-lubricators in which the axle is provided with a valve-chamber connected by a suitable oil-duct with the interior of the axle-box, the self-acting valve in said chamber opening inwardly and being adapted to be pushed inward by the nozzle of an oil pump or injector in oil-tight connection with the valve-chamber.

The object of the invention is to so arrange the valve-chamber in relation to the axle that said chamber will be at all times in absolutely oil-tight connection with the interior of the axle-box, and that the injector-nozzle may be quickly placed in a similarly-tight connection with the valve-chamber without necessitating the employment of an independent coupling device.

To this end the invention consists, principally, in locating the chamber with its valve, as above described, in a recess formed in the outer end of the axle-spindle, the recess being connected by an oil-duct with the axle-box interior.

The invention also consists in forming said valve-containing recess at its outer end with an internal thread, adapted to engage an external thread formed on the discharge-nozzle of the oil pump or injector, or on a suitable coupling-sleeve carried by said nozzle.

The invention finally consists in the combination, with the internally-threaded valve-containing recess, of an oil pump or injector provided with an externally-threaded nozzle mounted to turn loosely on the pump-reservoir, whereby the pump-barrel can be connected directly with the valve-containing recess without the use of any independent coupling device, as before stated.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a longitudinal section of an axle and attached oil-pump having my improvements applied thereto, and Fig. 2 is a cross-sectional view on the line *s s*, Fig. 1.

A is the axle-spindle, B the axle-box, and C the axle-nut, all of the usual description.

In carrying out my invention, I form in the extreme outer end of the axle-spindle A, by boring or otherwise, a central tubular recess, D, which is connected by a centrally-drilled oil duct or passage, E, and its branch duct, with the usual shallow groove, F, in the surface of the spindle. The end recess, D, is preferably formed with an internal thread to engage an external thread formed on the valve box or chamber G, which may be screwed to its seat in said recess by means of a screw-driver inserted in a transverse slot (not shown) in its outer end; or the recess D may be made slightly tapering and the smooth-faced valve-box driven directly to its seat therein.

The valve box or chamber G may be of the usual description, carrying a spring-pressed conical valve, H, fitted to a corresponding seat in the valve-box, and adapted to be pushed inward and opened by a perforated and notched nib, I, on the pump or injector nozzle J, entering the supply-orifice in said valve-box. The outer part of the spindle-recess G is also internally threaded to engage the external thread on the pump-nozzle J, which when the axle is to be oiled is screwed into said recess against the end of the valve box or chamber G, packing K, of suitable material, being preferably carried by the end of the nozzle J to render the joint oil-tight.

In order that the nozzle or discharge end J of the pump-barrel L may be easily rotated for screwing it into the valve-containing recess G in the axle-spindle, I mount said barrel L, with which the nozzle J may be integrally formed, or to which it may be rigidly attached, as hereinafter described, to turn loosely in a tube or cylinder, M, soldered or otherwise secured lengthwise along the top of the pump-reservoir N, or formed integrally therewith, the nozzle being provided with a milled hand-disk, O, for turning it.

For convenience of construction, I form the hand-disk O integrally with the nozzle J, which is made of a somewhat larger diameter than the rest of the pump-barrel L, and is screwed rigidly thereon, the end of the barrel proper forming an annular shoulder or seat, L', for the valve P, which opens outward, its closing-spring bearing against the annular

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shoulder Q, carrying the perforated nib I. The nozzle J may, however, be formed integrally with the body of the barrel L, if desired, the shoulder L' being turned or otherwise formed therein. The forward end of the barrel-containing tube or cylinder M projects somewhat beyond the end of the pump-reservoir N, in order to allow room for turning the hand-dick O.

In the rear part of the pump or injector barrel L is fitted and works the piston or plunger R, provided with a suitable handle for operating it. Connection between the pump-barrel L and the oil in the reservoir N is established by means of a vertical tube, S, screwed into the under side of the barrel-holding cylinder M, and an inlet-orifice, T, formed in the barrel and adapted to register with the end of the supply-tube S, an annular groove, T', being cut around the barrel in line with said tube S, so that however the barrel is turned connection is made between the supply-tube S and the inlet-orifice T.

In the upper end of the tube S is held an upwardly-opening valve, U, held upon its seat in said tube by a coiled spring, U'.

The pump-reservoir N is provided with a slide-covered opening, V, through which the oil is introduced for filling the reservoir. When the axle is to be oiled, the pump-nozzle is connected with the valve-chamber G, as above described, and the plunger R operated in the usual manner, when the oil will be forced through the several oil-passages in the axle-spindle into the interior of the axle-box, thoroughly lubricating the same.

Heretofore the valve-chamber G has been attached to the axle-nut and an oil-duct drilled through the nut and the axle-spindle. With this arrangement the oil forced into the valve-chamber under pressure was almost certain to escape between the nut and the axle and box, while an independent coupling device was necessitated for connecting the pump-nozzle with the oil-chamber.

In my improved construction the oil-chamber is placed in direct oil-tight connection with the interior of the axle-box; and, further, the use of an independent coupling device for the pump-nozzle is rendered unnecessary, the said nozzle being screwed directly into the valve-containing recess in the axle-spindle, so that multiplicity of external connections is avoided.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the axle spindle and box, the spindle being formed in its outer end with a recess connected by an oil-passage with the interior of the axle-box, of a valve box or chamber in said recess, a self-closing valve in said valve box or chamber opening inward, and an oil pump or injector arranged to be placed in oil-tight connection with said valve-chamber, and provided with a discharge-nozzle adapted to push said valve inward, substantially as shown and described.

2. The combination, with the axle-spindle A, formed in its outer end with the internally-threaded recess D, and the axle-box B, having its interior connected by an oil-duct with the recess D, of a valve box or chamber in said recess D, an inwardly-opening valve in said box or chamber, and an oil pump or injector provided with an externally-threaded nozzle adapted to be screwed into said threaded recess D, substantially as herein shown and described.

3. The combination, with the axle-spindle A, formed in its outer end with the internally-threaded recess D, and the axle-box B, having its interior connected with said recess D by an oil-duct, F, of a valve in said recess opening inward, and an oil pump or injector provided with an externally-threaded nozzle adapted to be screwed into said recess D, said nozzle being mounted to turn freely on the oil-pump reservoir, substantially as specified.

F. W. WURSTER.

Witnesses;
WILLIAM O. FITCH,
C. L. BURGER.

480

No. 621,276. Patented Mar. 14, 1899.

H. O. PAUL.

HOSE COUPLING.

(Application filed Oct. 6, 1897.)

(No Model.)

Fig. 1.

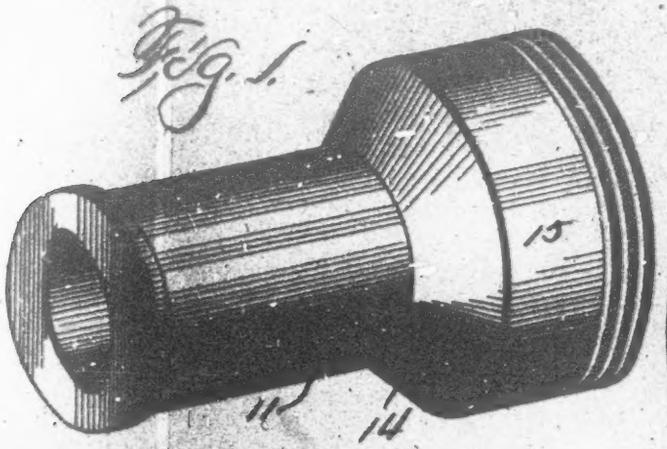


Fig. 2.

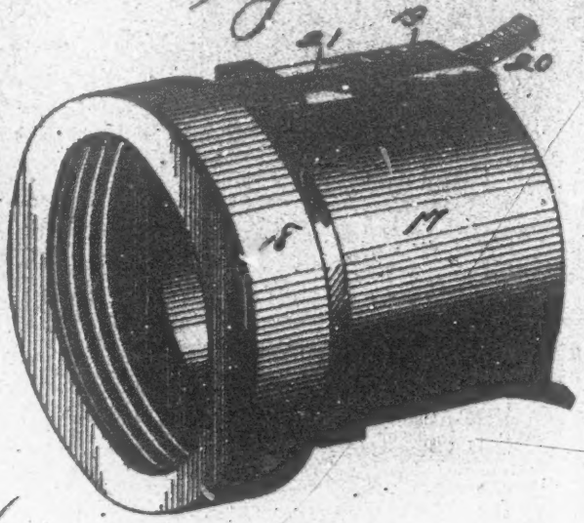


Fig. 4.

Fig. 3.

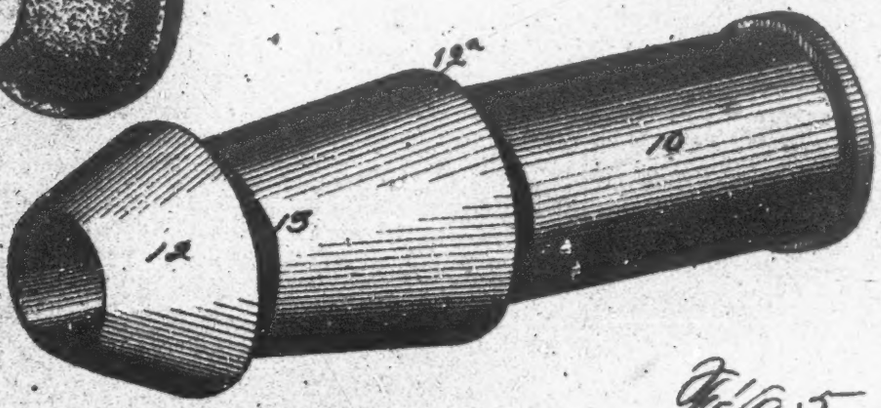
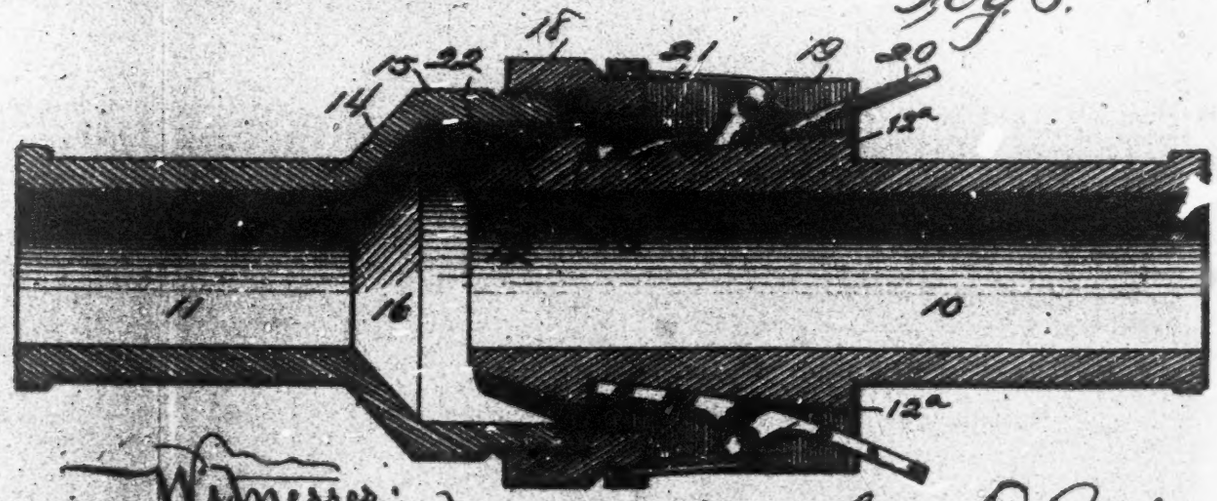


Fig. 5.



Witnesses:
W. L. Orwig
W. J. Dawley.

Inventor: Henry O. Paul,
by Thomas G. & J. Ralph Orwig,
attorneys.

UNITED STATES PATENT OFFICE.

HENRY O. PAUL, OF CLEAR LAKE, IOWA.

HOSE-COUPLING.

SPECIFICATION forming part of Letters Patent No. 621,976, dated March 14, 1899.

Application filed October 5, 1897. Serial No. 654,186. (No model.)

To all whom it may concern:

Be it known that I, HENRY O. PAUL, a citizen of the United States, residing at Clear Lake, in the county of Cerro Gordo and State of Iowa, have invented a new and useful Hose-Coupling, of which the following is a specification.

The object of this invention is to provide a hose-coupling of simple, cheap, strong, and durable construction which may be readily and quickly coupled or uncoupled without screwing or unscrewing any of the parts thereof and which is also made positively water-tight.

My invention consists in the construction, arrangement, and combination of the various parts of the device, as hereinafter set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a detail perspective view of a part of the hose-coupling to which the hose is attached. Fig. 2 shows a like view of a collar which is attached to the part shown in Fig. 1. Fig. 3 shows a like view of the opposite part of the hose-coupling to which the hose is attached. Fig. 4 shows a like view of a washer made of flexible material. Fig. 5 shows a longitudinal sectional view of the complete hose-coupling.

Referring to the accompanying drawings, the reference-numerals 10 and 11 are used to indicate two parts made of metal and having their outer end portions designed to be inserted in a flexible hose. On the end of the part 10 is an extended cone-shaped surface 12, and the reference-numeral 13 indicates a shoulder, the functions of which will be hereinafter described. The inner end portion of the part 11 flares outwardly at 14 and then extends parallel with the body portion of the part 11 at 15 to form the chamber 16, the said extension 15 being externally screw-threaded.

The reference-numeral 17 indicates a cylindrical collar having at its one end the internally-screw-threaded extension 18 to engage with the screw-threaded extension 15 of the part 11. Two slots 19 are extended longitudinally through the collar 17, and within these slots the pawls 20 are pivotally mounted. When the parts 10 and 11 are coupled, as shown in Fig. 5, one end of each of the pawls 20 engages the shoulder 13 of the part 10, and thus the part 10 is prevented from being uncoupled from the other parts of the device when the pawls 20 are in this position. Springs 21 are connected with the pawls 19 to normally hold them in position to engage the shoulder 13.

To provide a water-tight connection, I have used an apertured washer 22, made of rubber or other flexible material, which is clamped between the extension 15 of the part 11 and the collar 17. The outer edge of the washer has a flange extending outward to engage the annular internal shoulder of the collar 17 and the face of the end of the part 16, and its cone-shaped body conforms in shape and size with the inclined surface 12, against which it rests. In practical use it is obvious that the pressure of the water in the chamber 16 will force the washer 22 firmly against the inclined surface 12, so that none of the water can pass between the washer and the inclined surface, and as this is the only possible way that the water could escape from the device it is obvious that a perfect water-tight coupling is provided.

It is apparent that lateral movement of the section 10 relative to the washer and cylindrical collar 17 must be prevented in order to preserve a due water-tight contact between the washer and the conical head 12 of said section, and for this purpose I provide the latter with a second shoulder 12^a, which when section 10 is inserted in collar 17 bears against the inner surface of the latter. In this manner the section 10 is held in due longitudinal alinement with the other parts of the coupling.

The parts of the hose-coupling are connected as follows: The washer 22 is placed in position against the extension 15, and then the collar 17 is screwed to the extension 15 until the edges of the washer are securely clamped between the said extension and the collar. The washer 22 and the collar 17 are ordinarily left attached to the part 11 in the manner just described, so that the part 10 may be coupled to the other parts of the device at any time. The said part 10 is coupled by placing it within the collar 17 and then moving it toward the part 11 until the pawls 20 engage with the shoulder 13, whereupon the said part 10 will be prevented from being withdrawn from the collar. To uncouple the device, the outer ends of the pawls 20 are moved toward the part 10, which will obviously disengage

the opposite ends of the pawls from the shoulder 13 and allow the part 10 to be withdrawn from the collar. Thus a hose-coupling is provided which may be readily and quickly coupled or uncoupled without screwing or unscrewing any of the parts thereof and which is also made perfectly water-tight.

Having thus described the hose-coupling, what I claim as my invention, and desire to secure by Letters Patent of the United States therefor, is—

1. The combination of the detachable coupling-section 10, having a conical shouldered head and a second or rear shoulder located back of the first, with the elastic apertured washer, the coupling-section 11 and cylindrical collar 17, detachably connected, the rear shoulder of section 10, being located within the collar 17, and locking-pawls attached to the latter and engaging the first shoulder of section 10, as shown and described.

2. The combination, with the coupled sections 11 and 17, the latter having longitudinal slots as specified, and the elastic apertured washer or diaphragm, held between said sections, of the detachable section 10, having a conical shouldered head, and lever, spring-pressed locking-pawls pivoted in the aforesaid slots of part 17 and having tails or shanks which project outwardly and are accessible on the outer side of the collar, as shown and described.

3. A hose-coupling, comprising a part 10 having the inclined surface 12 and shoulder 13 thereon, a part 11 flared outwardly at 14 and then extended parallel with the body portion of the part 11 at 15, the said extension 15 being screw-threaded, a collar having slots extended longitudinally therethrough, and also having a screw-threaded extension on one end to engage with the extension 15 of the part 11, pawls pivotally mounted within the said slots and designed to engage with the shoulder 13 of the part 10, spring for holding the pawls in position to engage the said shoulders, and a washer 22 having its outer edge clamped between the extension 15 and the collar, and its inner edge arched to conform to the shape of the inclined surface 12, all arranged and combined substantially in the manner set forth and for the purposes stated.

HENRY O. PAUL.

Witnesses:
D. W. HURN,
H. E. PALMETER.

484

No. 895,438. PATENTED AUG. 11, 1908.

C. B. DELANY.

PNEUMATIC CHUCK.

APPLICATION FILED MAY 8, 1908.

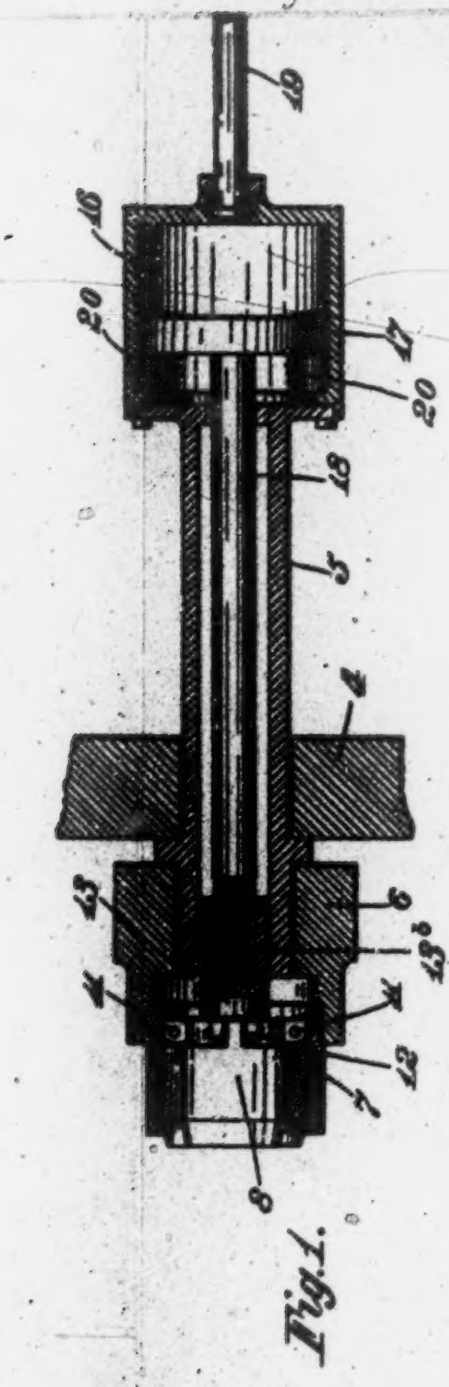


Fig. 1.

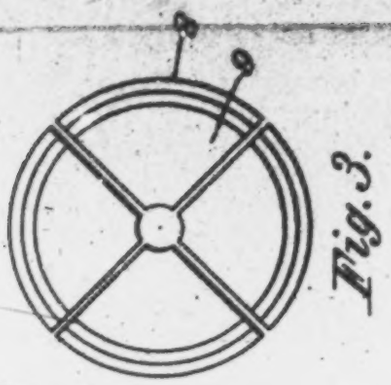


Fig. 3.

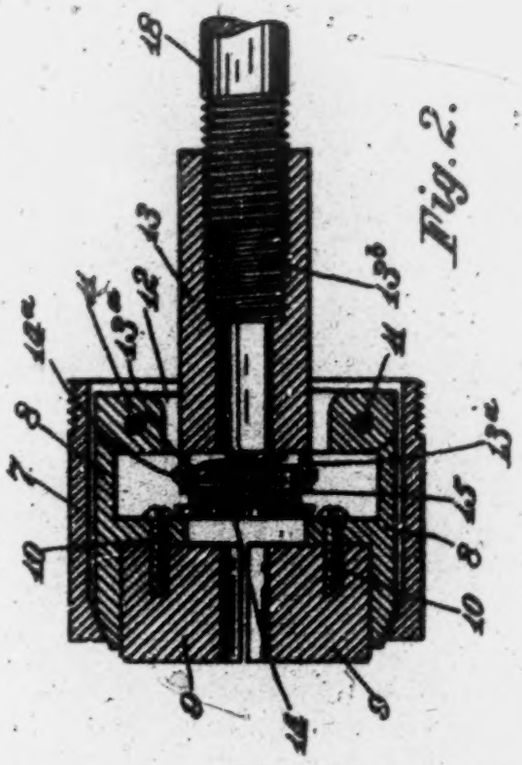


Fig. 2.

Witnesses
Benj. Finckel
Alice B. Cook

Inventor
Charles B. Delany
by Finckel & Finckel
his Attorneys

UNITED STATES PATENT OFFICE.

CHARLES B. DELANY, OF COLUMBUS, OHIO.

PNEUMATIC CHUCK.

No. 895,438. Specification of Letters Patent. Patented Aug. 11, 1908.

Application filed March 16, 1908. Serial No. 421,450.

To all whom it may concern:

Be it known that I, CHARLES B. DELANY, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Pneumatic Chucks, of which the following is a specification.

The object of this invention is to make improvements in chucks for lathes whereby they are operated and adjusted with greater facility and used with greater convenience.

The invention is embodied in the features of construction hereinafter described and pointed out in the appended claims.

In the accompanying drawings illustrating one instance of the invention—Figure 1 is mainly a central longitudinal sectional view with some parts left in full; Fig. 2 is a detail of the chuck jaws and contiguous parts; Fig. 3 is an end view looking to the right Fig. 2.

In the views 4 designates the head stock in which turns the tubular mandrel 5. At its left-hand end the tubular mandrel is externally threaded to receive the inner portion of the chuck socket 6 and said portion 6 is internally threaded to receive the outer portion of the chuck socket 7. The outer portion 7 is internally inwardly tapered at its outer end to contract the chuck jaws when they are thrust outward in the chuck socket.

8 designates chuck-bearing levers to which work-holding jaw blocks 9 are secured by screws 10. Different sizes of jaw blocks can therefore be used. The levers 8 are pivoted, as seen at 11, on ears 12 of a shank 13. The left-hand or outer end of the shank 13 is socketed and is furnished with a sliding head 14 with rounded edges, said head being backed by a spring 15 that presses the head against the jaw levers and tends to spread said lever and the jaw block asunder. The head 14 is held slidingly in place by means of small screws 14^a which work in slots 13^a in the shank 13. The right-hand or inner end of the shank 13 is made with a threaded socket 13^b.

The right-hand end of the tubular mandrel 5 has bolted to it a pneumatic or fluid-pressure cylinder 16 containing a piston 17 having a rod 18 that extends into the tubular mandrel 5. The left-hand end of the rod 18 is threaded to be adjustably engaged by the threaded socket 13^b. The degree of opening of the jaws upon retraction of the rod 18 can therefore be nicely regulated. The piston takes pressure at its right-hand side through a pipe 19 swiveled in a suitable manner, or as shown, to the cylinder. At its left-hand side the piston is pressed by springs 20. Fluid pressure on the piston thus holds the chuck jaws on the work and the springs 20 in conjunction with the spring-pressed head 14 release the chuck jaws from the work when the fluid pressure on the piston is exhausted. Any suitable form of valve, not shown, for admitting pressure to and exhausting it from the said cylinder can be provided. It will thus be observed, first, that fluid pressure is used in holding the work only; second, that springs not only move the jaws longitudinally in the socket but also spread and hold them asunder ready for the insertion of work, and third, that the extent of movement of the jaws with reference to the socket can be nicely regulated.

What I claim and desire to secure by Letters Patent is:

1. In a chuck, the combination of the chuck socket having a jaw-contracting end, jaw levers in said socket, a longitudinally movable shank to which said jaw levers are pivoted, and means between said shank and the jaw levers tending to spread the jaws asunder.

2. In a chuck, the combination of the chuck socket having a jaw-contracting end, jaw levers in said socket, a longitudinally movable shank to which said jaw levers are pivoted, and a spring-pressed head between said shank and the jaw levers.

CHARLES B. DELANY.

Witnesses:

JAMES STRADER,

BENJ. FINCKEL.

488

J. G. OLIVER.

LATHE CHUCK.

APPLICATION FILED JAN. 14, 1909.

926,761.

Patented July 6, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

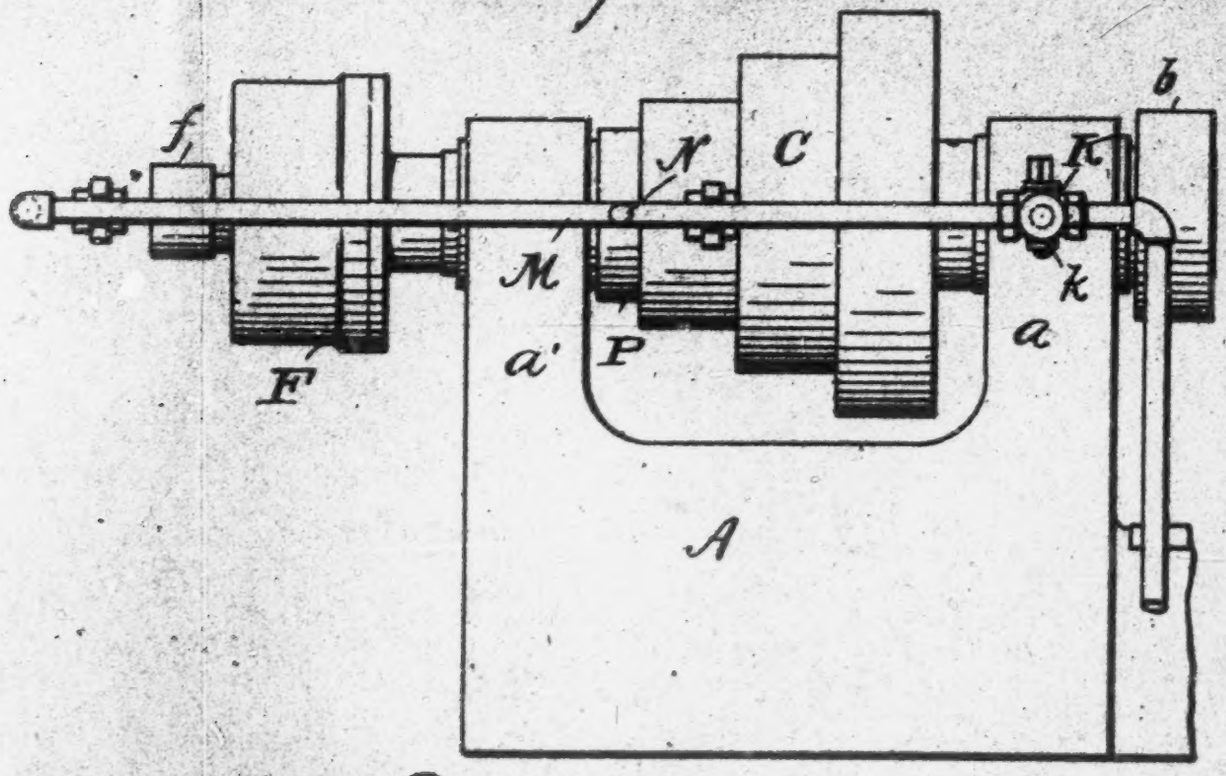
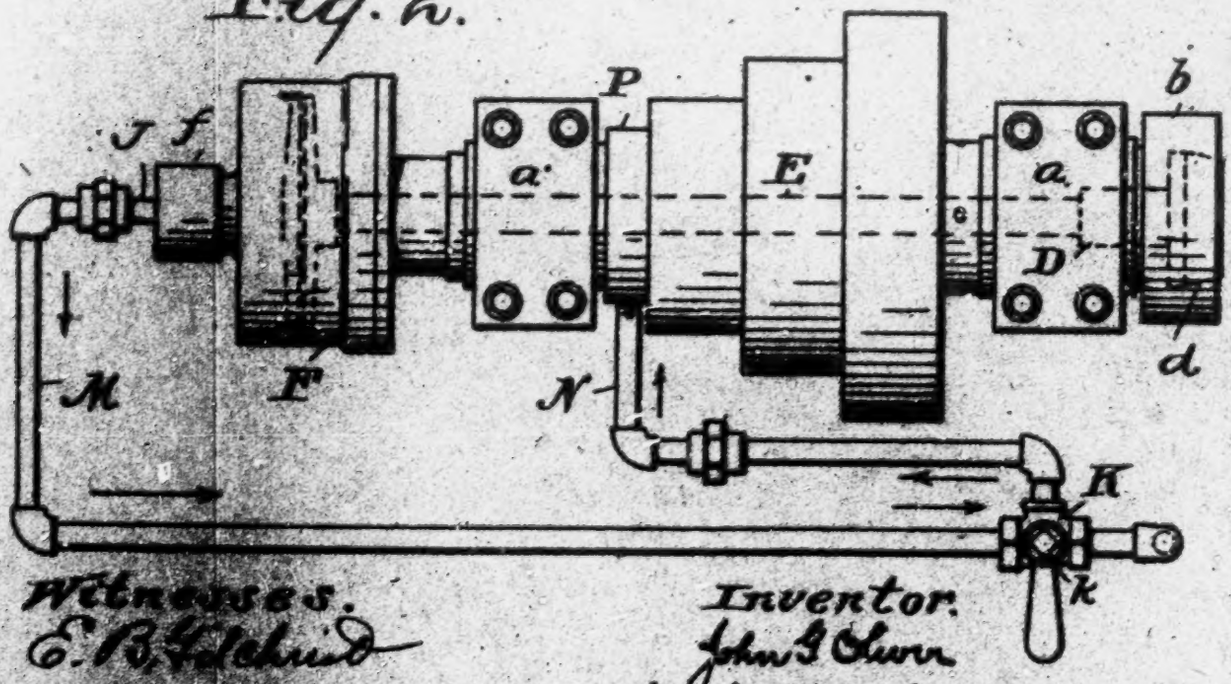


Fig. 2.



Witnesses.
E. B. Hildreth
H. C. Sullivan

Inventor.
John G. Oliver
by Thurston & Woodward
his attorneys

490

J. G. OLIVER.

LATHE CHUCK.

APPLICATION FILED JAN. 14, 1909.

926,761.

Patented July 6, 1909.

2 SHEETS—SHEET 2.

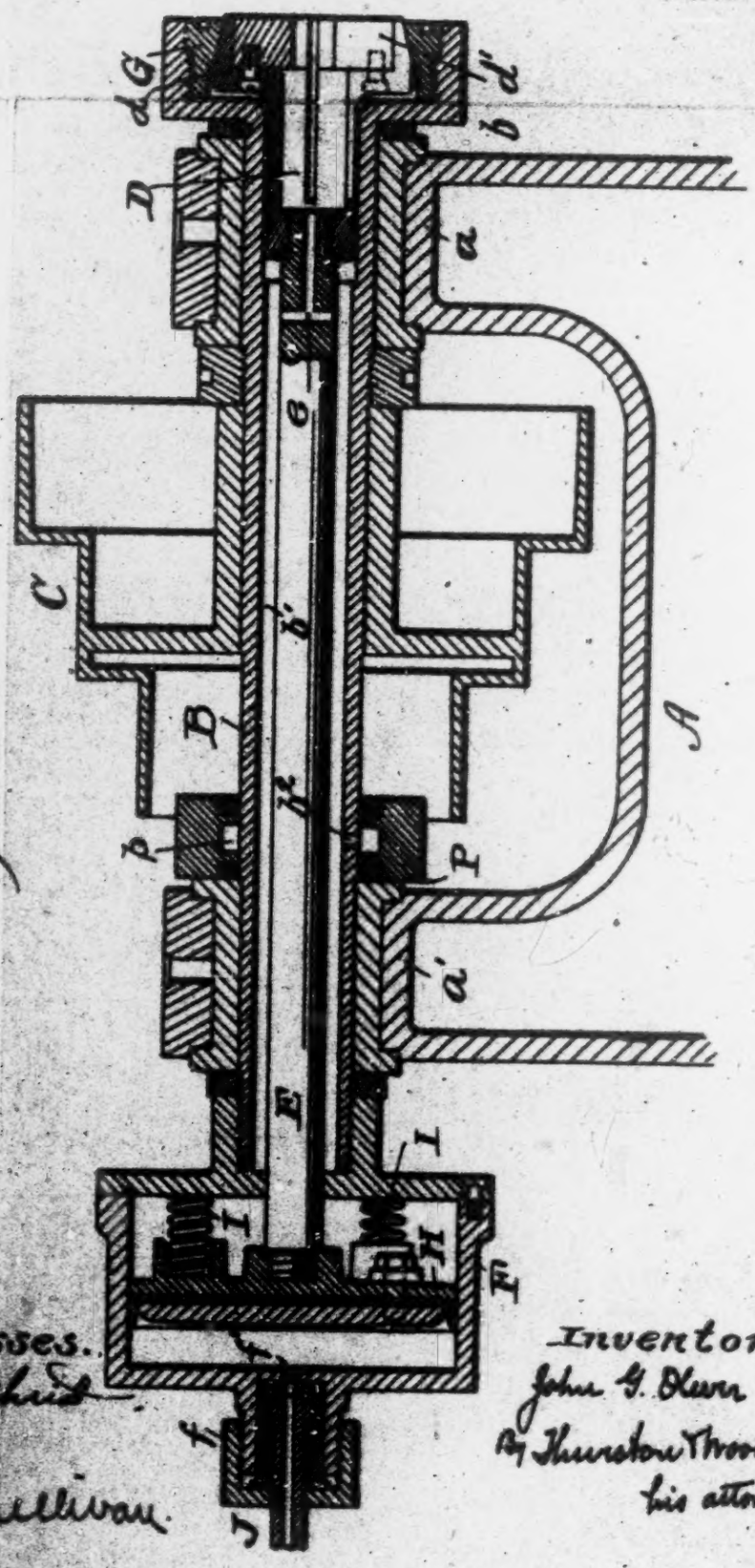


Fig. 3.

Witnesses.
E. B. Gilchrist
H. R. Sullivan.

Inventor.
John G. Oliver
By Thurston Woodward
his attorneys

UNITED STATES PATENT OFFICE.

JOHN G. OLIVER, OF CLEVELAND, OHIO, ASSIGNOR TO BARDONS AND OLIVER, OF CLEVELAND, OHIO, A PARTNERSHIP.

LATHE-CHUCK.

No. 926,761. Specification of Letters Patent. Patented July 6, 1909.

Application filed January 14, 1909. Serial No. 472,162.

To all whom it may concern:

Be it known that I, JOHN G. OLIVER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Lathe-Chucks, of which the following is a full, clear, and exact description.

This invention relates particularly to means by which the chuck of the lathe may be caused to grasp and release the work.

The object of the invention is to provide novel and efficient means for this purpose, and for additionally cleaning the chips from the chuck jaws, and, in some cases, for removing the work from the chuck jaws.

The invention consists in the construction and combinations of parts hereinafter described and pointed out definitely in the claims.

In the drawing, Figure 1 is a front view of the part of a lathe embodying the invention. Fig. 2 is a plan view of the same parts and Fig. 3 is a central vertical longitudinal section thereof.

Referring to the parts by letters, A represents an ordinary head stock of a lathe; and *a*, *a'* two standards which are parts thereof. B represents the tubular live spindle which is rotatably mounted in bearings on said standards. This spindle may be rotated by any suitable means, as, for example, the cone pulley C secured thereon. The chuck for holding work is mounted in the front end of this spindle, and may be of any well known or suitable construction adapted to be operated in the manner hereinafter specified. The chuck as shown is part of a tubular collet D slit longitudinally from its front end rearward, thereby forming a plurality of spring jaws *d*. The front or jaw end of the collet is preferably enlarged and externally tapered, as shown, and lies within an oppositely tapered ring G which is screwed into the enlarged end *b* of the spindle B. When the collet, whose rear end is slidably fitted within the spindle D, is moved forward the engagement of the oppositely inclined surfaces on the chuck jaws and ring G force said jaws inward and cause them to grip the work. Chuck blocks *d'* formed to properly grasp the work are secured to the chuck jaws. This particular form of chuck is well known in this art. It lends itself admirably to use with the mechanism constituting the novel features of the mechanism now to be described, for operating it; but any other form of chuck adapted to be operated by said mechanism may be employed in its stead.

Within the tubular spindle is the chuck rod E, the front end of which is screwed into the rear end of the collet. The rear end of this rod enters a cylinder F formed upon or secured to the rear end of the spindle B. Within this cylinder is a nicely fitting piston H to which the chuck rod is rigidly fastened. Springs I within the cylinder exert constantly a force tending to push the piston rearwardly within said cylinder, whereby the collet is drawn rearward and its jaws allowed to open.

A non-rotating coupling pipe J is rotatably fitted within an axially disposed stuffing box *f* on the rear end of the cylinder F, and through this coupling pipe and a port *f'* in the rear end of the cylinder, compressed air or other pressure fluid may be discharged into the rear end of said cylinder behind the piston. A pipe M is connected to this coupling pipe J and leads therefrom to the valve casing K in which is a three-way valve *k*. Another pipe N leads from this valve casing and is connected with a collar P which embraces the spindle but does not rotate with it. Within this collar is an annular recess *p* with which the pipe N is in free communication. In the spindle B is an opening *b'* which establishes communication between the annular recess *p* and an annular recess *b'* within the spindle around the chuck rod E. A duct *e* in the front end of the chuck rod establishes communication between this annular space *b'* and the tubular center of the collet D.

The operation and function of the described mechanism is as follows: After the operator has put a piece of work into the embrace of the chuck, he turns the valve *k* so as to admit the pressure fluid into the cylinder F behind the piston. The piston is immediately driven forward, pushing rod E and the collet D until the jaws of the latter close upon the work. This condition is maintained until the work has been machined; and then the operator turns the valve *k* so as to open up communication between the pipes M and N, at the same time closing communication with the source of the pressure fluid. Immediately the pressure fluid, which has been imprisoned in

the cylinder and pipe M, is allowed to flow out of the cylinder through pipe M, valve casing K and pipe N into the annular chamber *p* and thence into the annular space *b'* in the spindle, and therefrom, through duct *e*, into the center of the collet. As soon as the valve is turned, as stated, the springs I force the piston H rearward thereby permitting the collet jaws to open. As the pressure fluid flows into the collet, it will, if the work embraced by the chuck is of proper shape, eject the work from the chuck. In any event, whether the work is blown out or whether it is removed by the operator, the pressure fluid flowing into the collet will blow out of the chuck any chips which may have dropped and clung thereon.

Having described my invention, I claim:

1. In a lathe, the combination of the live spindle, a chuck mounted in its front end, a spring exerting its force to open the chuck, and a fluid pressure device for closing the chuck, with valve controlled means for admitting pressure fluid into said fluid pressure device and for exhausting the pressure fluid therefrom and conducting it to and discharging it into the rear end of the chuck.

2. In a lathe, the combination of the tubular live spindle, a chuck mounted in its front end, a fluid pressure cylinder on the rear end of the spindle, a piston therein, and a chuck rod intermediate of the piston and chuck, with valve controlled means adapted to discharge pressure fluid into the cylinder behind the piston and to conduct the exhaust from said cylinder into the spindle in front of the cylinder,—there being a duct leading from the piston to the open center of the chuck.

3. In a lathe, the combination of a tubular live spindle having a fluid pressure cylinder on its rear end, a chuck mounted in the front end of said spindle, a rod connected with said chuck and extending through the spindle into the cylinder, a piston in said cylinder to which said rod is connected, and a non-rotating coupling pipe axially mounted in the rear end of the cylinder and communicating with the interior thereof, with a valve casing containing a three-way valve, a pipe connecting said valve casing and coupling pipe, a non-rotating collar embracing the spindle and containing an annular recess, a pipe connecting said recess with the valve casing, said spindle having a hole through its wall communicating with said recess and there being a duct leading from the interior of the spindle to the open center of the chuck.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

JOHN G. OLIVER.

Witnesses:
E. L. THURSTON,
H. R. SULLIVAN.

494

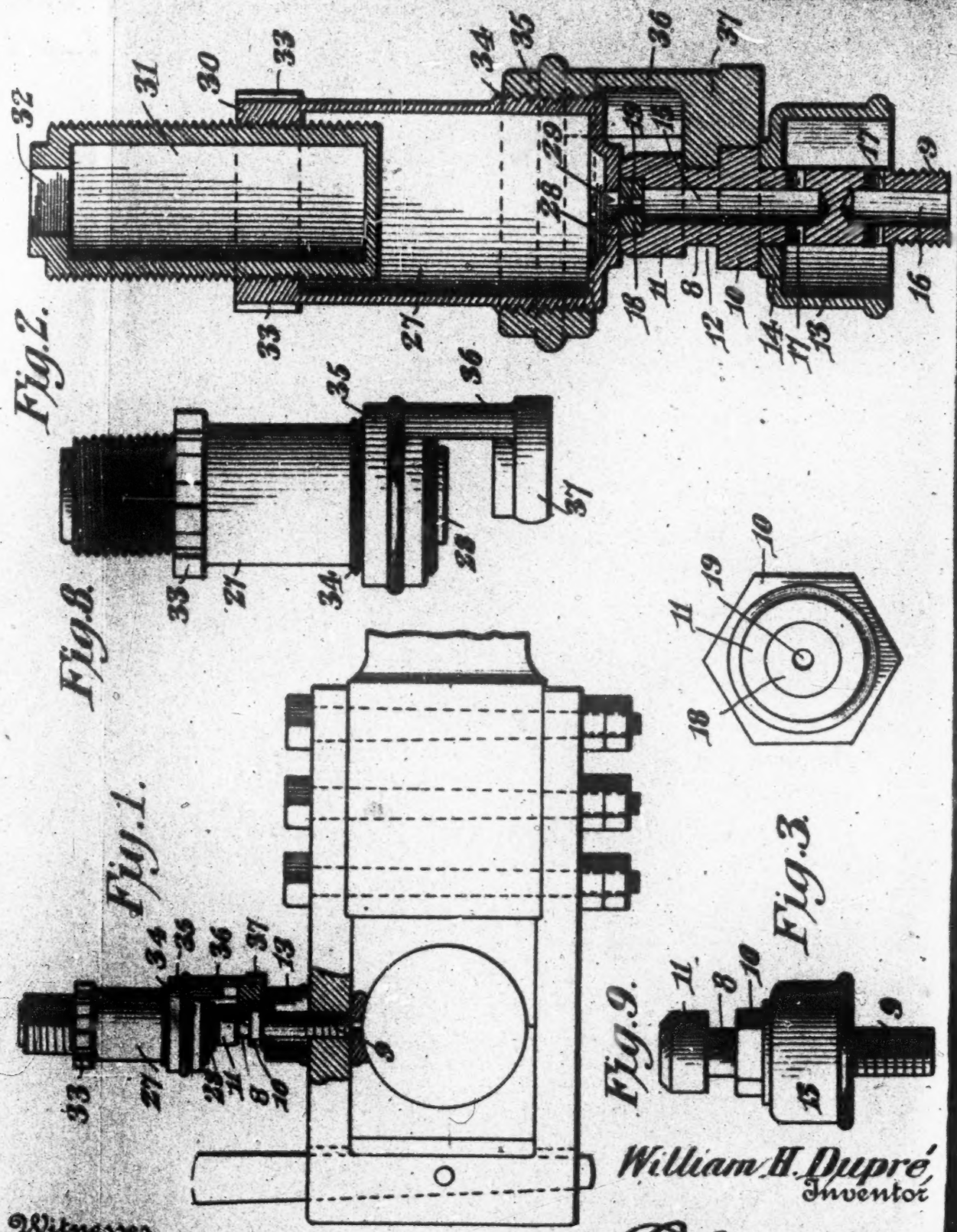
W. H. DUPRÉ.

LUBRICATING MEANS.

APPLICATION FILED APR. 4, 1908.

927,337. Patented July 6, 1909.

2 SHEETS—SHEET 1.



William H. Dupré,
Inventor

Witnesses
Jas. K. McCathran
[illegible]

By E. G. Siggers
Attorney

496

W. H. DUPRÉ.

LUBRICATING MEANS.

APPLICATION FILED APR. 4, 1908.

927,337.

Patented July 6, 1909.

2 SHEETS—SHEET 2.

Fig. 5.

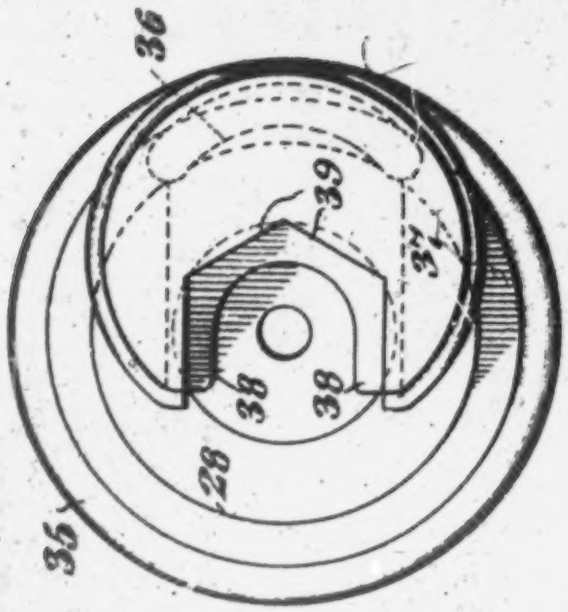


Fig. 7.

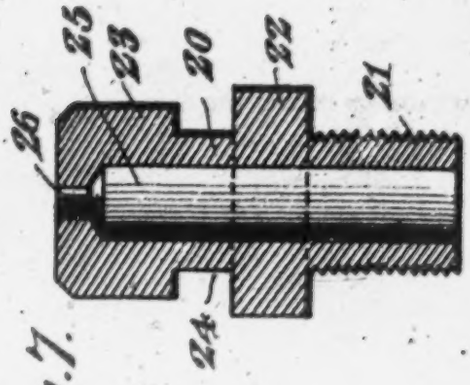


Fig. 4.

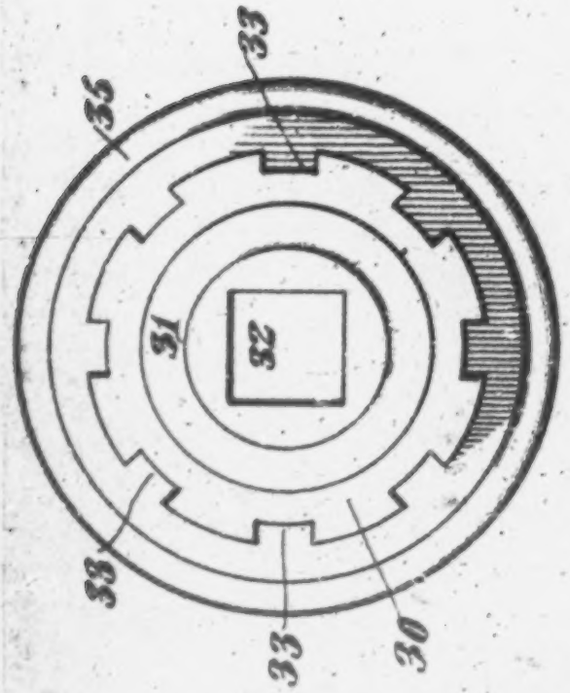
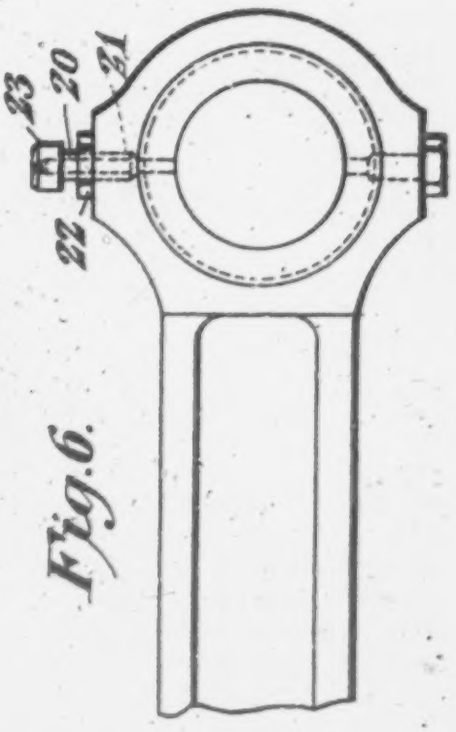


Fig. 6.



Witnesses

Jas. F. McCathran

B. L. Fate

William H. Dupré Inventor

By E. G. Siggers

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM HENRY DUPRÉ, OF VICKSBURG, MISSISSIPPI.

LUBRICATING MEANS.

No. 927,337. Specification of Letters Patent. Patented July 6, 1909.

Application filed April 4, 1908. Serial No. 425,185.

To all whom it may concern:

Be it known that I, WILLIAM H. DUPRÉ, a citizen of the United States, residing at Vicksburg, in the county of Warren and State of Mississippi, have invented a new and useful Lubricating Means, of which the following is a specification.

In lubricators of the compression grease cup type and particularly those employed on locomotive rods and the like, it is the ordinary practice to employ a compression cup at each bearing to be lubricated.

One of the principal objects of this invention is to provide novel mechanism of a simple nature, whereby a separate compression lubricator for each bearing is unnecessary, and holders for the lubricant are employed in connection with a single portable compression cup having means whereby it can be quickly and effectively attached to such holders and removed therefrom so that lubricant can be supplied to the same.

Two simple forms of the invention are disclosed in the accompanying drawings, but it will be evident from an inspection of the claims hereto appended that said invention is by no means limited to the embodiment herein set forth.

In the drawings: Figure 1 is a side elevation of one end of a rod showing the lubricator in position thereon, and illustrated partially in section. Fig. 2 is an enlarged vertical sectional view through the lubricator. Fig. 3 is a top plan view of the receiving plug. Fig. 4 is a top plan view of the grease cup. Fig. 5 is a detail plan view of the same and of the yoke for connecting it to the plug. Fig. 6 is a side elevation of a rod showing a slightly different form of lubricant receiver thereon. Fig. 7 is a vertical sectional view through the plug, the same being on an enlarged scale. Figs. 8 and 9 are respectively side elevations of the grease cup and receiving plug illustrated in Figs. 1 and 2 and indicating clearly their detachability.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment disclosed in Figs. 1–5 and 8 and 9, a lubricant receiving member is employed comprising a plug 8 having one end exteriorly threaded as shown at 9 so that it may be screwed into the part to be lubricated. This plug is provided between its ends with an angular enlargement 10, whereby it can be turned, and its outer end has an annular enlargement 11 spaced from the angular enlargement 10, thereby forming an annular groove or seat 12.

A casing 13 surrounds the inner portion of the plug, and has an outer end wall 14 through which said plug passes and against which the angular enlargement 10 is abutted. This casing terminates short of the inner end of the plug. The plug is provided with a longitudinal conduit or chamber comprising sections 15 and 16, the outer section 15 opening through the outer end of the plug, the inner section 16 opening through the inner end of the plug, and these sections having offset or transverse ports 17 at their inner ends, which communicate with the interior of the casing 13. The outer end of the section 15 is preferably contracted by a disk or washer 18 located therein and having a small port 19 therethrough. Instead of this type of receiving member, a much simpler form may be employed, as illustrated in Figs. 6 and 7. In this embodiment of the invention, the plug 20 has its inner end threaded as shown at 21, and has an angular enlargement 22 between its ends. It is also provided with an outer head 23 spaced from the enlargement 22 and forming an annular groove or seat 24. A conduit or chamber 25 is formed longitudinally in the plug, the outer end being contracted to form an inlet port 26. These plugs or receiving members, as illustrated in Figs. 1 and 6 are threaded into the parts to be lubricated so that the inner ends of their channels communicate with the bearings.

A lubricant delivering member is employed in the form of a compression grease cup comprising a barrel 27 having an inner end wall 28 provided with a discharge orifice 29 and an outer end wall 30, through which is threaded an expelling plunger 31. This plunger is preferably hollow, and has an angular opening 32 in its outer end to receive an instrument for turning the same. The barrel 27 has a peripheral series of teeth 33 at one end to be engaged by a spanner, while its other end is exteriorly threaded as shown at 34.

A connecting yoke is employed comprising a ring 35 in which the barrel 27 is adjustably threaded, this ring being connected by a web 36 with a hook 37. The hook, as illustrated

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more particularly in Fig. 5, is bifurcated, forming a pair of fingers 38 that are arranged to embrace the plugs 8 or 20 and be received in the annular grooves 12 or 24. The said hook furthermore has an angular socket 39 that receives the angular enlargements 10 or 22 of the plugs, which thus prevent the turning of the yoke.

In use, the receiving members or plugs are applied to the bearings, either form being employed as necessity or desire may dictate or seem best. But one delivering member or grease cup is necessary for a series of these, and it will be evident by reference to Figs. 1 and 2 that when it is desired to supply lubricant to the plugs or receiving members, it is only necessary to engage the hook 37 with the plug, then turn the barrel 27 until its inner end firmly abuts against the outer end of the plug, whereupon the discharge orifice 29 will register with the inlet port 19 of said plug. The plunger 31 is then screwed into the barrel, whereupon the lubricant will be forced into the plug, filling the chamber or conduit sections and the interior of the casing 13. In fact in applying these devices, inasmuch as solid lubricant is employed, experience has demonstrated that when the hook 37 has been attached to a plug, if the plunger 31 is engaged and rotated, the resistance occasioned by said lubricant will be sufficient to turn the barrel 27 and cause it to abut against the plug before the plunger will turn in said barrel, and the lubricant be thereby expelled. To remove the grease cup, it is only necessary to rotate the barrel 27 in a direction to disengage the plug, whereupon the binding engagement between the parts will be relieved and the hook can be slipped from said plug, as will be evident. With this structure therefore, the plugs in themselves constitute reservoirs. The advantage for the form disclosed in Fig. 2 resides more particularly in the fact that a greater amount of lubricant can be supplied at one time. The mechanism is particularly advantageous in that a grease cup is not necessary for each bearing, and the single grease cup, as disclosed, can be quickly applied to and detached from the different plugs or holders. Moreover, when applied, it is effectively locked in position, so that the proper supply of lubricant to the bearings is assured.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art without further description and it will be understood that various changes in the size, shape, proportion, and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In a lubricating apparatus, the combination of a lubricant-receiving member mounted in fixed position on the article to be lubricated, a removable lubricant-delivering member arranged in abutting relation to the first member, the abutting parts of the members having registering ports, and a yoke supported wholly by and detachably connected with the receiving member and carrying the delivering member and with which the latter is removable.

2. In lubricating means of the character disclosed, the combination with a lubricant receiving member, of a lubricant delivering member including a barrel and an expelling plunger operating therein, and a connecting device that detachably engages one member and is adjustably engaged by the other member.

3. In lubricating means of the character disclosed, the combination with a lubricant receiving member, of a lubricant delivering member, and a connecting yoke that detachably engages the receiving member and is adjustably engaged by the lubricant delivering member.

4. In lubricating means of the character disclosed, the combination with a lubricant receiving member, of a delivering member, and a connecting yoke having a hook at one end that detachably engages the receiving member and having a ring at the other end in which the lubricant delivering member is adjustably engaged.

5. In lubricating means of the character disclosed, the combination with a plug having a threaded end and provided with an angular portion, and a groove located adjacent to the said angular portion, said plug having a lubricant receiving conduit therein, of a yoke having a bifurcated hook that embraces the plug and is seated in the groove, said hook having an angular socket that receives the angular portion of the plug, said yoke also having an interiorly threaded ring and a grease cup threaded into the ring and adjustable therein toward and from the plug.

6. In a lubricating apparatus, the combination of a lubricant-receiving member fixed on the part to be lubricated and having a port, a lubricant-delivering member resting on the first member and having a port communicating with the first-mentioned port, a yoke carrying the delivering member and removably connected with the receiving member and means for connecting the delivering member and yoke to the receiving member by relative rotary movement between the members while they are held in coöperative relation by the yoke.

7. In lubricating means of the character disclosed, the combination with a lubricant receiving plug having its inner end exterior

readed and having a chamber provided ith an inlet opening in its outer end, of a lu- icant delivering member adjustable toward d from the outer end of the receiving mem- r and having a discharge orifice that regis- rs with the inlet opening of said receiving mber when the adjacent ends of the mem- rs are together.

8. In lubricating means of the character disclosed, the combination with a receiving member and a yoke for attachment there- to, of a lubricant holding barrel adjustably mounted on the yoke, and an expelling plun- ger that operates in the barrel.

9. In lubricating means of the character disclosed, the combination with a receiving member and a yoke for attachment thereto, said yoke including a ring that is interiorly threaded, of a lubricant holding barrel threaded in said ring and having a discharge orifice in its inner end, and an expelling plunger threaded into the outer end of the barrel.

10. The combination with a holding plug having one end threaded and provided with a lubricant conduit opening through each end, said plug having an angular enlarge- ment between its ends and having an annu- ar flange spaced from the angular enlarge- ment forming a groove or seat, of a detach- able lubricant delivering member having a discharge opening adapted to be registered with the lubricant conduit in one end of the plug, and a yoke engaging said lubricant delivering member and detachably engaging said seat.

11. A lubricating device including a cas- ing having an open side closed by the article to be lubricated, and a plug passing centrally through the end wall of the casing, said plug having a shoulder engaging against the ex- terior face of said end wall to form a fasten- ing for the casing, said plug at one end being adapted to engage with the article to be lubricated and having a passage extending from its interior to its exterior and opening within said casing.

12. A lubricant holding plug having its inner end threaded and having an angular enlargement, and a casing surrounding a portion of the plug and having an end wall through which the plug passes and against which the enlargement abuts, said plug hav- ing conduits respectively opening through the ends of the plug and having ports com- municating with the interior of the casing.

13. The combination with a lubricant holding plug having one end threaded, being hollow to form a lubricant holding reservoir therein, having an outlet orifice at one end and an inlet orifice at the opposite end of less diameter than the reservoir, said plug having an angular enlargement, and an an- nular groove or seat disposed alongside the enlargement, of a detachable lubricant de- livering member having in its lower end an orifice adapted to register with the inlet orifice in the lubricant holding plug, and a yoke engaging the delivering member and detachably engaging said plug at the annu- lar seat thereof.

14. A lubricant holding plug having one end threaded and having a lubricant holding reservoir therein that opens through the threaded end, said reservoir having an inlet orifice in the opposite end of less diameter than the reservoir, said plug having an an- gular enlargement and an annular groove or seat disposed alongside the enlargement, and a casing surrounding a portion of the plug and having an end wall through which the plug passes and against which the angular enlargement abuts, the reservoir in the plug comprising separate sections having lateral ports at their inner ends that open through the sides of the plug and communicate with the interior of the casing.

15. In a device of the character described, the combination with an enlarged cup- shaped casing whose lower edge engages with the article to be lubricated, of a plug passing through the wall of said casing, the lower end of the plug engaging with the article to be lubricated, said plug having a passage ex- tending from its end exterior to the casing to a point within the casing and there open- ing into the casing, the article-engaging end of the plug being provided with the lubricant delivering passage opening at its upper end into the space within said casing.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILLIAM HENRY DUPRÉ.

Witnesses:
J. R. SMITH,
JNO. A. HENNESSEY.

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R. S. NEWTON.

HOSE AND COUPLING TESTING APPLIANCE.

APPLICATION FILED MAR. 7, 1914.

1,118,876. Patented Nov. 24, 1914.

Fig. 1.

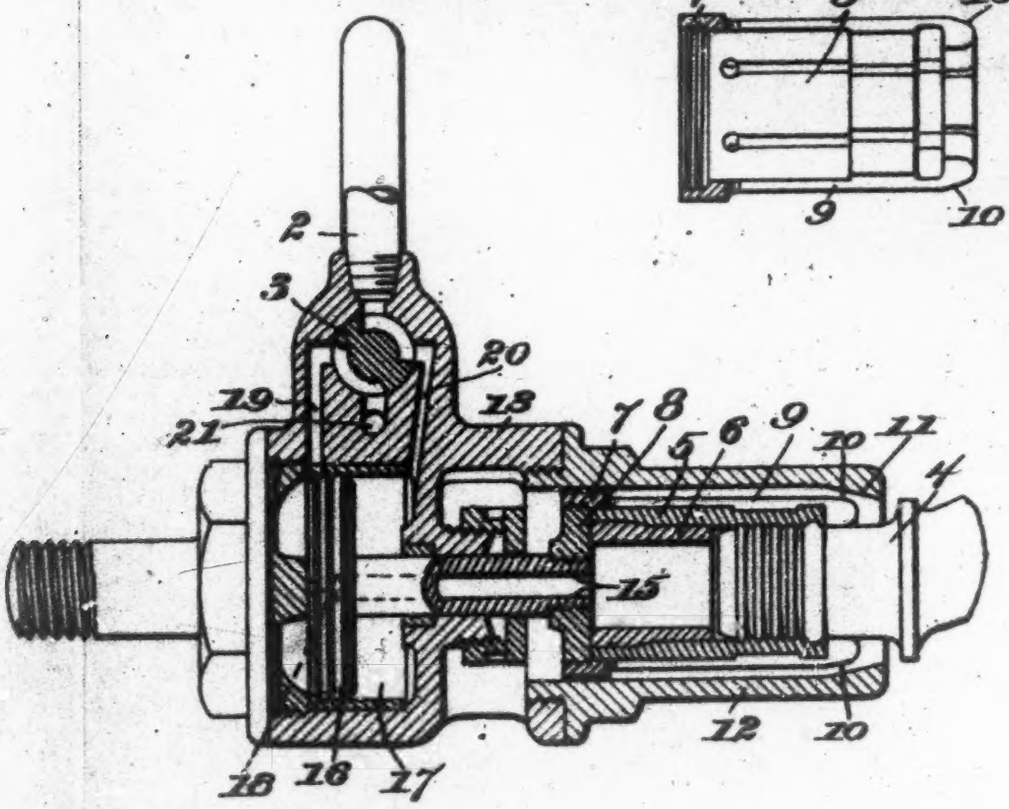


Fig. 3.

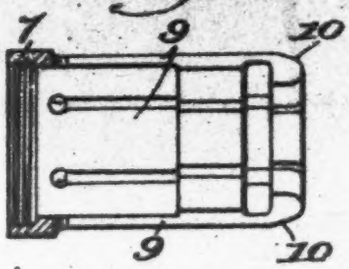
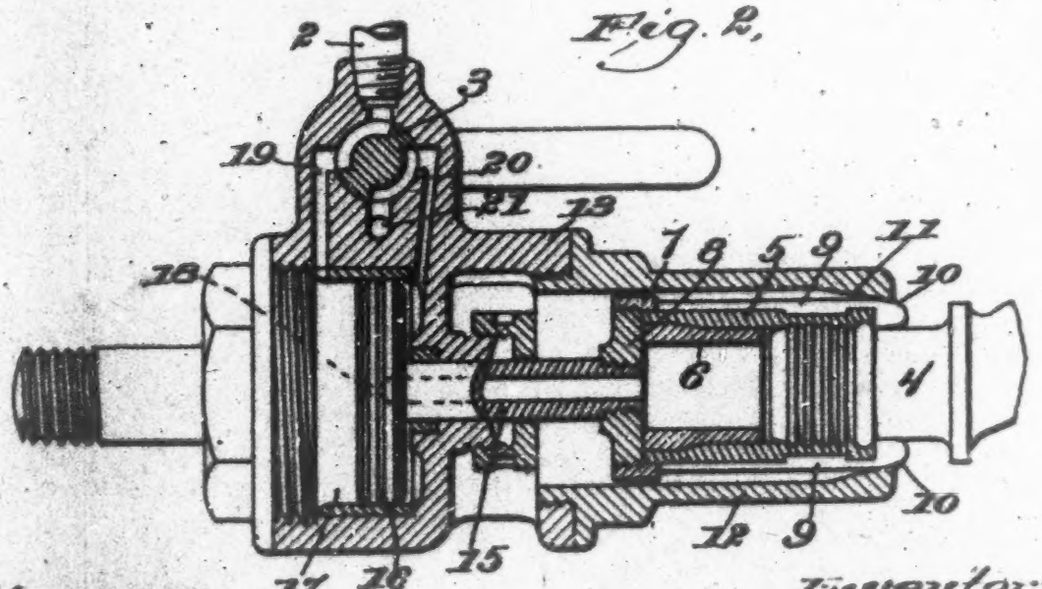


Fig. 2.



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Mary L. Maloney.

Inventor:
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by H. J. Weimore
Att'y.

UNITED STATES PATENT OFFICE.

ROBERT SHEDROCK NEWTON, OF WATERTOWN, NEW YORK, ASSIGNOR TO NEW YORK AIR BRAKE COMPANY, A CORPORATION OF NEW JERSEY.

HOSE AND COUPLING TESTING APPLIANCE.

1,118,876. Specification of Letters Patent. Patented Nov. 24, 1914.

Application filed March 7, 1914. Serial No. 823,096.

To all whom it may concern:

Be it known that I, ROBERT SHEDROCK NEWTON, a citizen of the United States, residing in Watertown, in the county of Jefferson and State of New York, have invented an Improvement in Hose and Coupling Testing Appliances, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to an appliance for testing hose by fluid pressure, and embodies instrumentalities which when applied to the nipple or coupling member of the hose to be tested is automatically clamped and sealed thereto by the pressure which is introduced for testing the hose and by which said coupling member is automatically ejected after the desired test has been made.

Figure 1 is a longitudinal section of the appliance with the parts in the position assumed when the appliance is to be applied to the coupling member of the hose to be tested, being also the position of the working parts for the ejecting operation after the test has been made; Fig. 2 is a similar section with the parts in the position for automatically clamping and sealing the testing device on the coupling member of the hose to be tested; and Fig. 3 is a sectional detail showing a portion of the clamping member of the testing device.

The appliance herein shown is intended for facilitating the operation of introducing fluid under pressure into a length of hose pipe including a nipple or hose clamping member for the purpose of testing the same for leakage and strength to withstand internal fluid pressure. The said appliance is connected as at 2 with a suitable source of air or other fluid under pressure to be used in the test and is provided with a suitable valve or stop cock 3 by which the admission and exhaust of the fluid may be controlled by the operator.

The provision for engaging and making a fluid tight or sealed connection with the nipple or coupling member 4 of the hose to be tested comprises a packing tube consisting of a piece of tubular fluid tight material such as a short length of hose pipe 5 of proper size to receive the end of the coupling member 4 within one end thereof, the other end being tightly clamped between an internal expander or short tube 6, and a clamping ring 7, mounted upon a carrying plate 8 with which the packing tube 5 is thus caused to make an air tight connection.

The forward end of the packing tube 5 which is to engage with the member 4 of the hose to be tested is surrounded by an expansible clamp or compressing device composed of a number of spring fingers 9 shown as extending from the clamping ring 7 which fingers are radially yielding, and when unconfined will spread or yield radially in order to admit of the clamping member 4 being easily inserted into the end of the yielding packing tube 5 as shown in Fig. 1. The said fingers 9 at their outer ends are inclined or cam shaped as shown at 10 and are contained within a surrounding tapering cam surface 11 formed at the end of a sleeve 12 connected with the body 13 of the testing appliance, said sleeve 12 being shown as surrounding and inclosing the yielding packing tube 5 and the clamping fingers 9 which parts with their supporting plate 8 are longitudinally movable in said sleeve 12. The said carrying plate 8 is connected by a rod or stem 15 with a piston 16 working in a cylindrical chamber 17 the said rod or stem 15 being tubular and there being a relatively small passage 18 through the piston which affords communication from the cylindrical chamber 17 at one side of said piston (the left hand side in the drawing) to the interior of the packing tube 5. Ports 19, 20 lead from the ends of the cylindrical chamber 17 to the controlling cock 3 which controls connections between said ports and the inlet port 2 and an exhaust port 21 as will be readily understood from the drawing.

Using the terms "right" and "left" with reference to the parts as shown in the drawing, when the stop cock or controlling valve 3 is in the position shown in Fig. 1 the space

in the chamber 17 at the left of the piston 16 is connected through the exhaust port 21 with the atmosphere so that the pressure is exhausted therefrom, and air is admitted through the port 20 into the chamber 17 at the right of the piston 16 which is thus forced to and retained at the left hand end of its stroke in the said chamber 17 as shown in Fig. 1. The nipple clamping appliances 5, 6, 7, 8, connected with said piston by the stem 15 are thus also in their left hand position relative to the sleeve 12, and the cam surfaces 10 of the clamping fingers are disengaged from the cam surface 11 of the sleeve 12, as shown in Fig. 1, leaving the spring fingers 9 free to expand outwardly so that the coupling member 4 may easily be inserted in the yielding packing tube 5. When the coupling member 4 has been thus inserted the controlling cock 3 is moved to the position shown in Fig. 2 thus connecting the ports 20, 21, and exhausting the air from the right hand side of the piston 16, while admitting air through the port 19 into the chamber 17 at the left hand side of said piston 16.

The air may flow from the chamber 17 through the passage 18 into the packing tube 5 and coupling member 4 inserted therein, but the passage 18 is of sufficiently small capacity to cause the pressure to rise rapidly in the chamber 17 at the left of the piston 16 and thus to force the piston to move toward the right from the position shown in Fig. 1, to that shown in Fig. 2. In this movement, the cam surfaces 10 at the ends of the fingers 9 are engaged by the cam surface 11 which forces said fingers radially inward and causes them to compress the packing tube 5 firmly against the outer surface of the coupling member 4 so as to make a tight joint therewith, so that the fluid which continues to flow through the passage 18 and tubular stem 15 will enter the coupling member 4 and hose connected therewith so as to exert a testing pressure therein.

After the test has been made, and it is desired to disconnect the appliance from the hose so that it may be readily applied to another similar hose to be tested, the controlling cock 3 is again moved to the position shown in Fig. 1 which permits air to exhaust from the chamber 17 at the left of the piston 16 and causes air to enter through the port 20 at the right of the piston 16 which is thus moved from right to left back to the position shown in Fig. 1. This releases the clamping fingers 9 leaving them free to expand, and while the fluid from the clamping tube 5 and hose may flow back through the passage 18 and thence escape to the air, the said passage 18 is so small that it does not immediately make a large reduction in the pressure in the hose the reaction of which thus serves to eject forcibly the coupling member 4 from the packing tube 5 as soon as the pressure of the spring fingers 9 thereon is relieved by the disengagement of the cam surfaces 10, 11. The coupling member 4 is thus promptly ejected and no pressure is then left in the packing tube 5 so that another coupling member may be readily inserted and thereafter tested by a repetition of the operations which have been described.

The automatic action of the clamping and sealing connection in response to the introduction and release or exhaust of the fluid by which the test is made renders the apparatus very convenient and quick operating, it being necessary only for the attendant to insert the coupling member of the hose to be tested and then to manipulate the handle of the stop cock 3, first to admit the fluid which effects the firm holding and sealing of the hose to be tested and the introduction of the testing fluid, after which the other movement of the stop cock automatically effects the release and ejection of the coupling member and prepares the apparatus for another coupling member to be inserted.

What I claim is:

1. A hose clamping and testing appliance comprising a yielding packing tube adapted to receive a hose coupling member within it, an expanding clamp coöperating with said tube, a cam coöperating with said clamp, and a piston connected with said clamp and adapted to be actuated by the fluid to be introduced for testing, the pressure of the fluid introduced operating automatically to cause the clamp to press the packing tube into engagement with the coupling member inserted therein, substantially as described.

2. A hose testing appliance comprising an expending clamp composed of spring fingers, and a packing tube surrounded thereby, and a cam for coöperating with said fingers to contract said clamp; a piston connected with said clamp; and a cylinder for said piston, and means for controlling the introduction and exhaust of fluid, to act upon said piston, and a communication from said cylinder through the interior of said clamp, whereby fluid pressure admitted to the cylinder actuates the piston to contract the clamp, and passes through said communication to the interior of the clamp and hose clamped therein.

3. In a hose testing appliance the combination of an expanding clamp with a piston connected with said clamp and a cylinder for said piston and means for controlling the introduction and exhaust of fluid to and from the ends of said cylinder and a communication from said cylinder to the interior of said clamp, whereby fluid admitted through one end of the cylinder actuates the piston to contract the clamp upon a coupling member inserted therein, and passes from said cylinder into said clamp and coupling

member, and fluid admitted to the other end of said cylinder operates the piston to expand the clamp and permit the coupling member to be ejected therefrom by the fluid pressure contained therein substantially as described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT SHEDROCK NEWTON.

Witnesses:
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508

A. J. LAVOIE.

CHUCK.

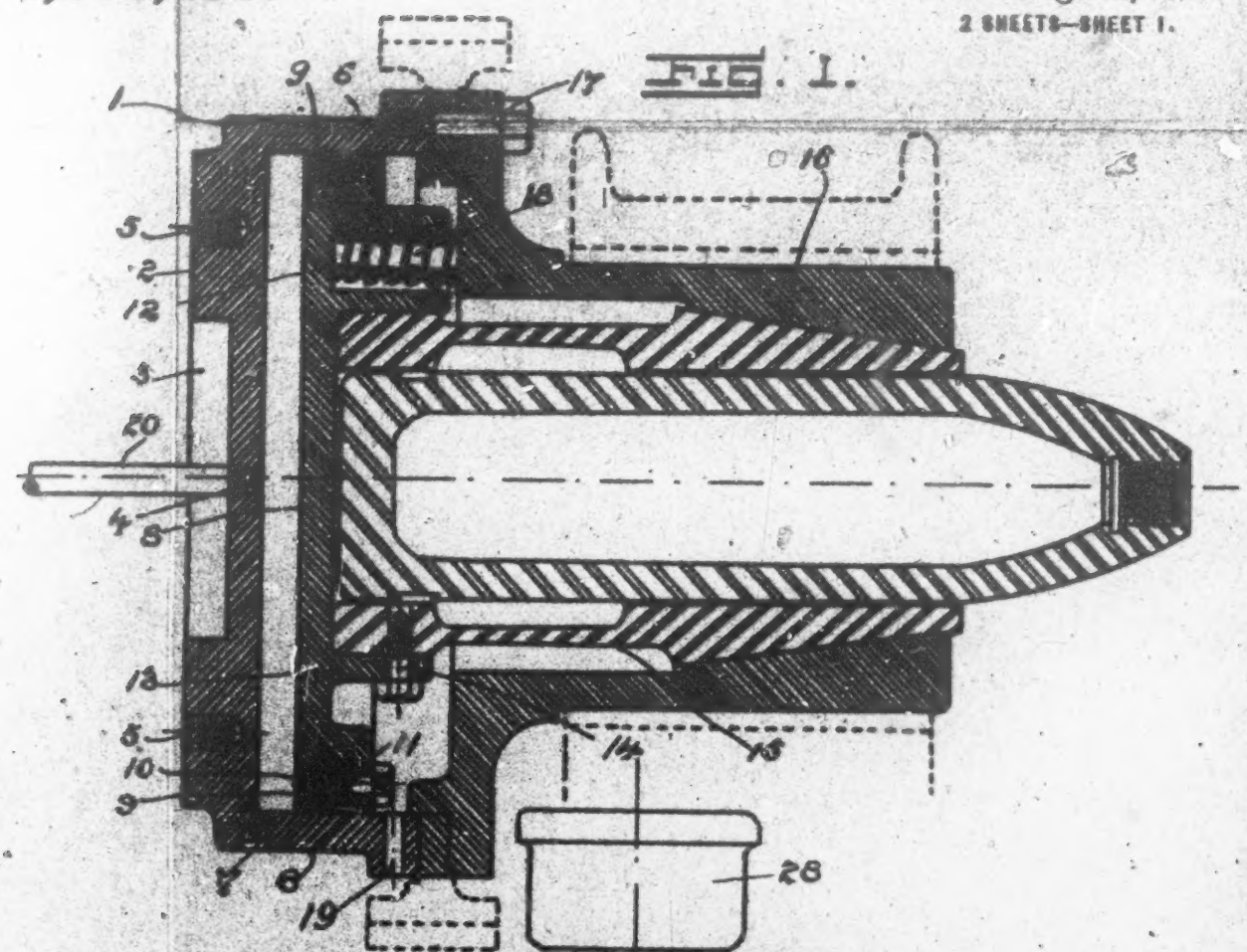
APPLICATION FILED AUG. 16, 1916.

1,236,453.

Patented Aug. 14, 1917.

2 SHEETS—SHEET 1.

FIG. 1.



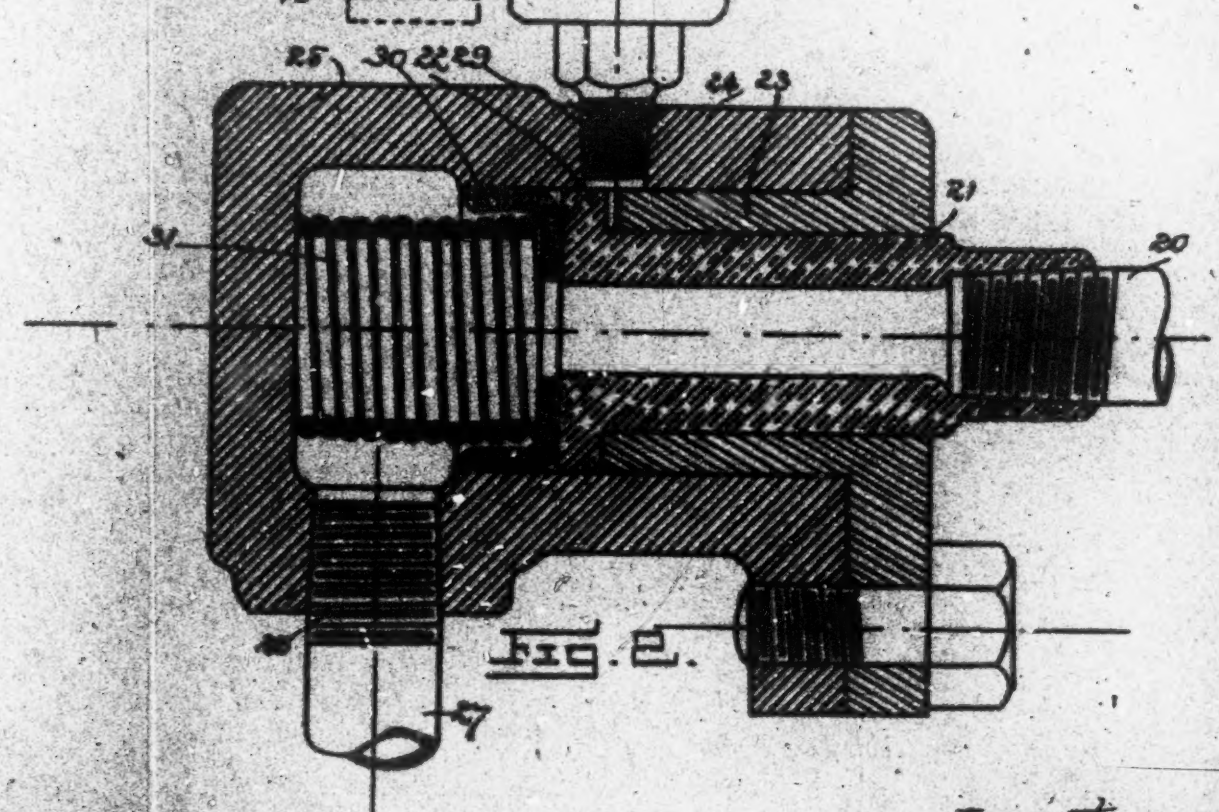


FIG. 2.

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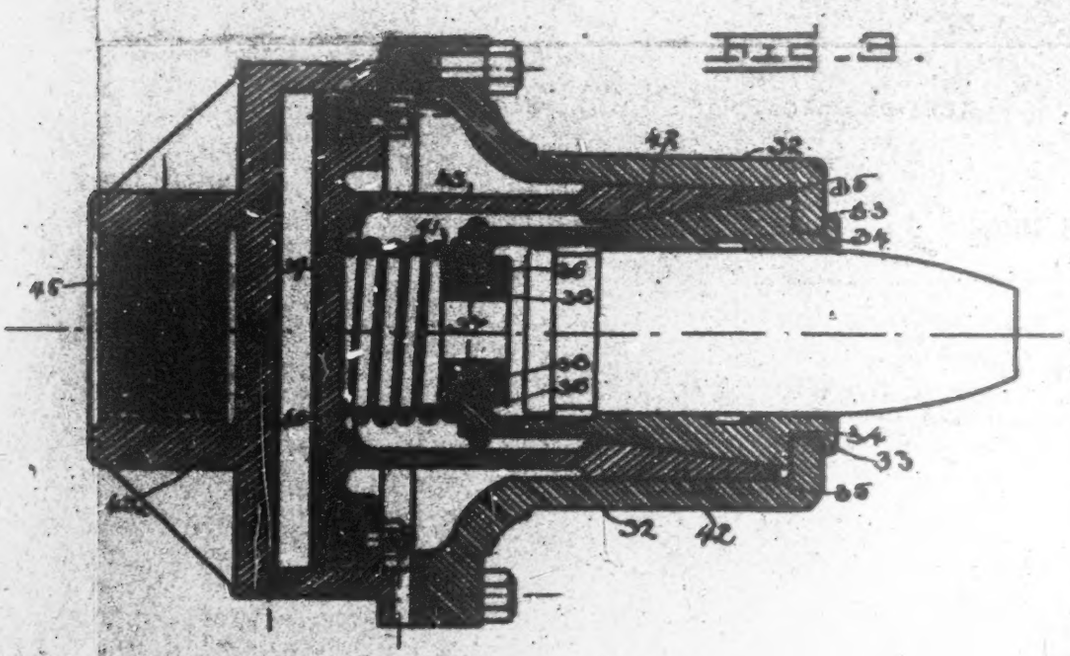
APPLICATION FILED AUG. 16, 1916.

1,236,453. Patented Aug. 14, 1917.

2 SHEETS—SHEET 2.

FIG. 3.



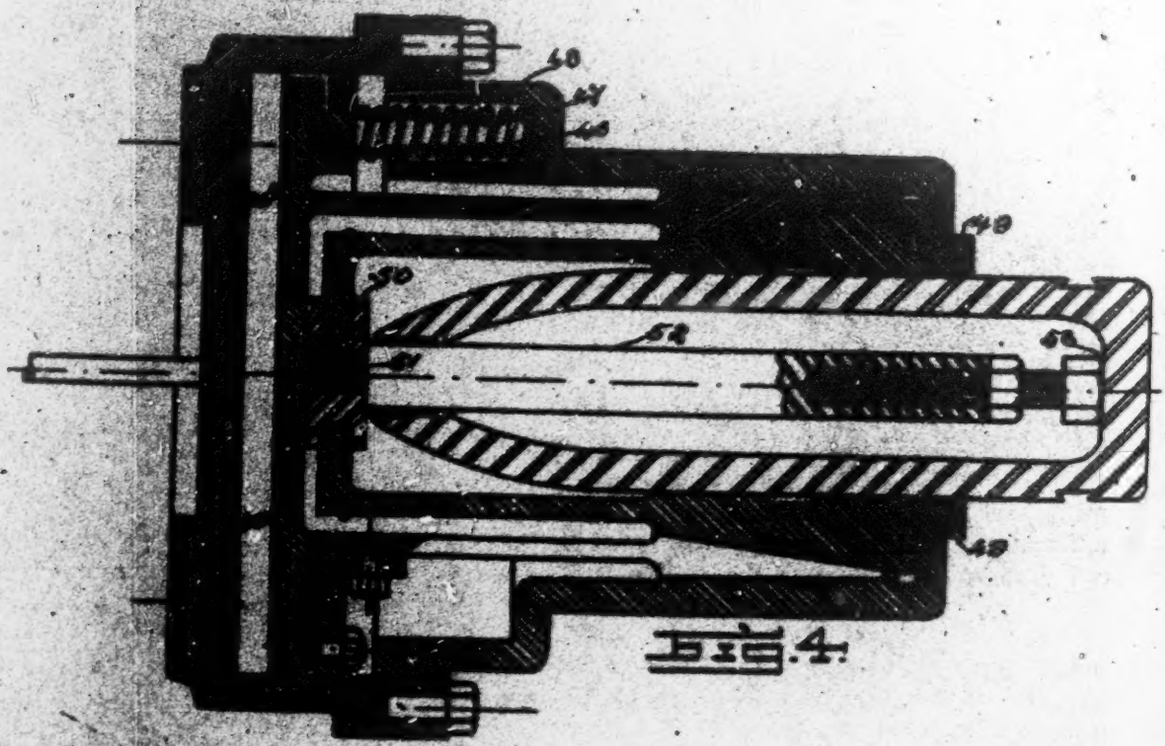


FIG. 4.

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By E. J. Letherstonhaugh
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UNITED STATES PATENT OFFICE.

ALPHONSE JOSEPH LAVOIE, OF MONTREAL, QUEBEC, CANADA.

CHUCK.

1,236,453. Specification of Letters Patent. Patented Aug. 14, 1917.

Application filed August 16, 1916. Serial No. 115,218.

To all whom it may concern:

Be it known that I, ALPHONSE JOSEPH LAVOIE, subject of the King of Great Britain, and resident of 6 Lafontaine street, in the city of Montreal, Province of Quebec, Dominion of Canada, have invented certain new and useful Improvements in Chucks, of which the following is the specification.

The invention relates to improvements in chucks as described in the present specification and illustrated in the accompanying drawings that form part of the same.

The invention consists essentially in the novel means employed for directly engaging the piece of work and operating said means by expansile fluid.

The objects of the invention are to simplify the construction of pneumatically operated chucks and thereby cheapen the production of the attachment and facilitate the repairing and the cleaning of the parts, to increase the output of a machine, to furnish parts that may readily be attached to old and new machines generally to provide a chuck cheap to manufacture and durable in its construction.

In the drawings Figure 1 is a longitudinal mid-sectional view, showing a piece of work engaged by the clamping jaws.

Fig. 2 is an enlarged longitudinal sectional view of the air chamber and connection at end of lathe.

Fig. 3 is a longitudinal sectional view showing a modification of the invention.

Fig. 4 is a longitudinal sectional view of a similar form to that illustrated in Fig. 3 and its arrangement with a piece of work inserted.

Like numerals of reference indicate corresponding parts in each figure.

Referring to the drawings, 1 is the air cylinder formed of the back wall 2 having the central recess 3, the air inlet 4 in the center and the screw holes 5 by means of which it is attached to a plate at the head of the lathe. 6 is the side wall of the cylinder extending from the back wall 1 and having the drain hole 7.

The piston 8 operates in the cylinder 1 and is formed to receive the cup leather packing 9 at the edge thereof and the piston follower 10 in said packing, these being secured by the cap screws 11. The outer face of the piston 8 is formed with the spring recesses 12 and the flanges 13, and secured to the latter by the screws 14 are the clamping jaws 15, which in their open positions are spaced one from the other and are adapted to close in on pressure and fill or partly fill in the intervening spaces and grip the work, said jaws on the outer sides being tapered outwardly on the outer surfaces only.

The chuck casing 16 is held to the cylinder end by the screws 17 and its wall is inwardly tapered from the outer end on the inner surface only, corresponding with and opposing the taper of the clamping jaws 15, consequently when the said jaws are moved outwardly, the surfaces of the jaws oppose the surface of the chuck casing and the former are drawn together.

The springs 18 are contained within the recesses 12 and abut at one end the piston 8 and at the other end a flange of the chuck casing 16 and exert a constant outward pressure on said chuck casing and consequently a constant inward pressure on the piston 8, thereby insuring the return of the latter after each operation.

The outer surface of the chuck casing 16 may turn in a bearing, if required, as shown in dotted lines, and it may be turned with the cylinder by gear mechanism, also dotted, though this device illustrated is particularly applicable to direct application to the head, but changes in constructive details are likely to occur for different applications, and this will not affect the invention as patented so long as they are within the scope of the claims for novelty.

The cylinder 1 and chuck casing 16 are preferably provided with cleaning openings 19 beyond the piston 8, so as to avoid the collection of dust and dirt.

The air feed pipe 20 extends to the inlet 4 and is secured to the back wall 2 and passes through the shaft of the head stock of a lathe or forms the shaft itself. At the end of the lathe the pipe 20 is secured to a hollow spindle 21 having a flange 22 at its inner end turning behind the bushing 23, in which said spindle 21 is journaled, said bushing being inserted into the bearing end

24 of the air chamber casing 25, the latter having an air inlet 26 from which the feed air pipe 27 leads to a supply of compressed air.

The grease cup 28, having a threaded hollow stem 29, is mounted on the upper side of the bearing end 24 and said stem 29 is inserted in a correspondingly threaded orifice situated between the inner end of the bushing and spindle flange.

The cup leather packing 20 is placed against the face of the flange 21 and is held thereagainst by the helical spring 31 between it and the opposing wall of the air chamber.

In Fig. 3 the chuck casing 32 is inwardly flanged at its outer end 33 and said flange extends into the jaws 34, which engage a piece of work as shown. The jaws 34 have rearwardly inclined surfaces 35 on their outer sides and terminate at their extreme rear ends in the inwardly turned flanges 36.

The separate ring base 37 is annularly grooved at 38 to receive the flanges 36 and is cushioned against the piston 39 by the spring 40, for returning said piston, a length of spring 41 engages also at the back of the flanges 36 the said jaws 34 in a suitable groove and holds the flanges securely but resiliently in the groove 38.

The wedges 42 between the inclined walls 35 and the chuck casing 32 are rigidly supported by the extensions 43, which are rigid with the piston 39 or integral therewith, therefore any movement outwardly or inwardly of said piston tightens or loosens the jaws on the piece of work as the case may be.

The form illustrated in Fig. 3 is adapted to be screwed to the spindle and has the air inlet 43 into the cylinder 45, but it may be secured in any suitable way.

In Fig. 4 the piston 46 is returned by the springs 46 inserted in the recesses 47 formed in the chuck casing 48, the latter otherwise is formed similarly to the casing 32 and engages like jaws 49.

The jaws 49 at their rear ends engage a ring base 50 abutting the outer surface of the piston 46, said base 50 having a central threaded orifice 51 in which is screw threaded the mandrel 52, said mandrel having at its outer end the pin 53 screw threaded therein for adjusting its length to the piece of work as [illegible] shown in said Fig. 4.

Otherwise this form is not materially different from those already described and may be secured to the machine by cap screws as by arrangement shown or in any suitable way.

In the operation of this invention, the work, here represented by a shell, is placed within the clamping jaws in a suitable position for working and then the air is turned on through the feed pipe, from which it reaches the air chamber and flows on through the spindle and air pipe to the cylinder.

The air reaching the cylinder instantaneously effects the operation of the piston against the spring pressure mentioned in the foregoing and this results in moving the clamping jaws forwardly as they are attached to said piston.

The forward movement of the clamping jaws brings the surfaces of their tapering portions into contact with the opposing inner wall of the chuck and as said chuck wall is rigid the jaws are immediately forced in on the work, gripping it tightly and effectively.

At the release of the air pressure the piston is moved backwardly in the cylinder by the springs, as already explained, and the grip of the jaws thus loosened. It will be thus seen that the work can be handled very expeditiously and as the principal parts of the device are exposed, there is little fear of accident stoppage or loss of time from other cause, besides the air is in direct contact with the gripping parts and therefore its use must be more efficacious than air operated chucks already known.

The operation of the invention as illustrated in Figs. 3 and 4 is only different in the manner of effecting pressure on the gripping jaws and as these are shown as being separate from the piston, naturally there must be the additional parts in the form of wedges rigid with the piston and guided along the inner wall of the chuck casing against the inclined surfaces of the actual jaws by means of which the work is held.

The support of the reversed piece of work by the mandrel forming one of the parts of the jaw mechanism is both plainly illustrated and described and needs no further mention here, except to say it forms a very efficient and compact mechanism, especially in the art of manufacturing shells used for war munitions, though it is very useful in many kinds of work done on lathes and like machines, and in taking the invention generally and not in one or other form particularly it will readily be understood that it is really a general purpose chuck.

The invention is of course more useful on lathes than other machines and in the description has been mentioned in connection therewith, but it must be understood, that it is applicable to various machines, and that its parts and their arrangement may be considerably modified so long as such changes are within the scope of the claims for novelty following.

What I claim is:—

1. In a chuck, a housing in two parts secured together by bolts and having a com-

mon axis, the outer part being of reduced size and forming a grip casing and the inner part forming a cylinder adapted to be secured directly to the machine spindle head and having a central air inlet, a piston operating in said cylinder, gripping members closing in on the work on the forward thrust of said piston and automatically returnable therewith and a feed pipe extending through the machine in alinement with said spindle.

2. In a chuck, a housing in two parts secured together by bolts and having a common axis, the outer part being of reduced size and forming a grip casing and the inner part forming a cylinder adapted to be secured directly to the machine spindle head and having a central air inlet and a piston spring-held to its inward position and having outwardly projecting pieces therefrom engaging the wall of said casing.

3. In a chuck, a housing in two parts secured together by bolts and having a common axis, the outer part being of reduced size and forming a grip casing and the inner part forming a cylinder adapted to be secured directly to the machine spindle head and having a central air inlet, a hollow shaft extending through the machine parts and forming a feed pipe to said cylinder, a piston operating in said cylinder, and gripping members adapted to close in on the work on the forward thrust of said piston.

4. In a chuck, a housing in two parts secured together by bolts and having a common axis, the outer part being of reduced size and forming a grip casing and the inner part forming a cylinder adapted to be secured directly to the machine spindle head and having a central air inlet, a hollow shaft extending through the machine parts, an air chamber casing having an air inlet and outlet, a feed pipe connected to said inlet, a member projecting from said casing and connected with said hollow shaft, a piston in said cylinder and gripping members operated by said piston.

5. In a chuck, a housing in two parts secured together by bolts and having a common axis, the outer part being of reduced size and forming a grip casing and the inner part forming a cylinder adapted to be secured directly to the machine spindle head and having a central air inlet, a hollow shaft extending through the machine parts and forming a feed passage to said cylinder, an air chamber casing having an air inlet and air outlet, a feed pipe connected to said inlet, a sleeve journaled in said air casing and secured to said hollow shaft, a piston operating in said cylinder and gripping members operated by the forward thrust of said piston.

6. In a chuck, a cylinder longitudinally stationary and rotating with the machine member and having a central air inlet through the end thereof, a hollow shaft extending through the machine parts to said inlet, an air chamber casing having an air inlet and an air outlet and a lubricating passage through the upper side, a bushing extending inwardly from the inlet opening and rigidly secured, a flanged sleeve journaled in said bushing and secured to said shaft and having its flange extend to the casing wall beyond said bushing in proximity to said lubricating passage, a cup leather packing engaging the casing wall and said sleeve flange, a helical spring engaging said packing and the end wall of the casing, a feed pipe to said inlet, an oil cup secured in said passage, a casing secured to said cylinder, a piston operating in said cylinder and gripping members closing in on the work on the forward thrust of said piston.

7. In a chuck, a housing in two parts secured together by bolts and having a common axis, the outer part being of reduced size and forming a grip casing and the inner part forming a cylinder adapted to be secured directly to the machine spindle head and having a central air inlet, a piston operating in said cylinder and spring-held to its idle position, clamping jaws connected with said piston and operated on the forward thrust of said piston and closed in through contact with said casing, and a hollow shaft extending through the machine parts and forming a passage for the flow of air into said cylinder behind said piston.

8. In a chuck, a housing in two parts secured together by bolts and having a common axis, the outer part being of reduced size and forming a grip casing and the inner part forming a cylinder adapted to be secured directly to the machine spindle head and having a central air inlet, a hollow shaft forming the feed passage to said cylinder and extending through the machine parts, a piston operating in said cylinder and spring-held to its inner position and clamping jaws having beveled surfaces and engaged by projections from said piston and closed in on the forward thrust of said piston.

9. In a chuck, a cylinder rigidly secured to the spindle head and having an air inlet, a hollow shaft extending through the machine parts and leading to said inlet, a casing projecting from and rigidly secured to said cylinder, a piston operating in said cylinder and having pieces projecting therefrom, clamping jaws supported by said pieces and supporting a mandrel base and a mandrel secured in said base and projecting outwardly therefrom.

10. In a chuck, a cylinder rigidly secured to the spindle head and having a central air inlet, a hollow shaft extending through the

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machine parts and leading to said inlet, a piston in said cylinder directly in front of said inlet, a casing forming a guide and rigidly secured to said cylinder, clamping jaws operated by the forward thrust of said piston and supporting a base carried outwardly by said piston and a mandrel screw threaded into said base and having an adjusting pin screw threaded thereto at the outer end thereof.

Signed at Montreal, Quebec, Canada, this 4th day of August 1916.

ALPHONSE JOSEPH LAVOIE.

Witnesses:

V. J. FETHERSTONHAUGH,

GEORGE P. QUILLIAN.

516

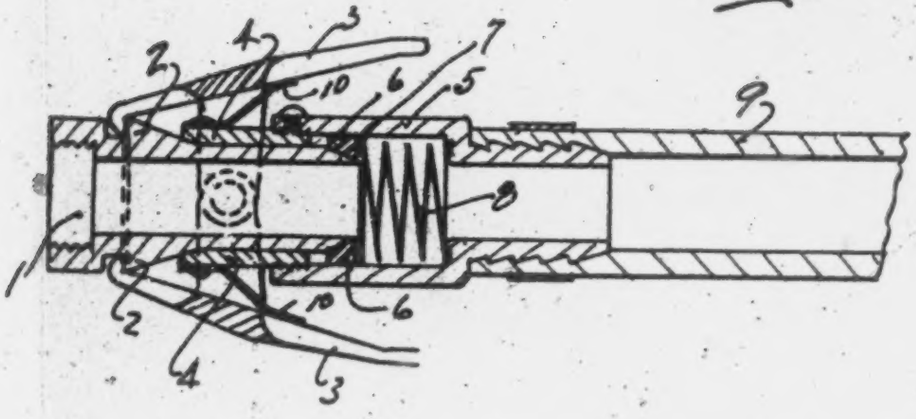
N. ULLELAND.

QUICK ACTING HOSE COUPLING.

APPLICATION FILED MAY 1, 1917.

1,253,309. Patented Jan. 15, 1918.

Fig. 1.



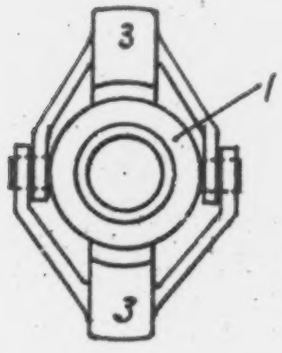


Fig. 2.

INVENTOR

Nels Ulleland

BY

Fred C. Goss

ATTORNEY

UNITED STATES PATENT OFFICE.

NELS ULLELAND, OF KENT, WASHINGTON.

QUICK-ACTING HOSE-COUPLING.

1,253,309. Specification of Letters Patent. Patented Jan. 15, 1918.

Application filed May 1, 1917. Serial No. 165,793.

To all whom it may concern:

Be it known that I, NELS ULLELAND, a citizen of the United States, residing at Kent, in the county of King and State of Washington, have invented certain new and useful Improvements in Quick-Acting Hose-Couplings, of which the following is a specification.

This invention relates to quick acting hose connections and has for its office to provide an improved and novel form of quick acting hose coupling for connecting hose to faucet.

Other objects will appear as my invention is more fully explained in the following specification, illustrated in the accompanying drawings and pointed out in the appended claim.

In the drawings Figure 1 is central cross section of my device. Fig. 2 is an end elevation of same.

Referring more particularly to the drawings numeral 1 indicates a threaded faucet extension which is adapted to be screwed on to the threaded end of the faucet. An annular shoulder 2 is provided around the extension member 1. The face of shoulder 2 is slightly under cut in order to provide a grip for pawl levers 3 which are pivoted to a sleeve 4. Sleeve 4 fits slidably outside of the outer end of extension member 1 and is connected by means of threads to cylindrical hose extension member 5. Hose extension member 5 is of greater diameter than sleeve 4 and therefore is also of greater diameter than the outer end of faucet extension member 1. Faucet extension member 1 is tapered at its outer end and projects beyond the sleeve 4 and into the chamber of the hose extension member 5. A gasket 6 of resilient material fits snugly and slidably inside of the chamber of the hose extension member and against the tapered surface of the faucet extension member. A cut washer 7 backs the gasket up and provides a seat for one end of a spring 8 which holds the gasket tightly in place. The gasket is so positioned that the pressure of a fluid within the members mentioned would tend to make the gasket tighter rather than looser. A hose 9 is clamped to the outer end of the hose extension member 5 in the usual manner. Springs 10 hold the pawl levers 3 in engagement with shoulder 2. When disconnected the sleeve 4 prevents the gasket 7 from leaving the chamber of member 5. In order to connect the hose to the faucet it is necessary that member 1 be permanently secured to the faucet and that the other members be secured to the end of the hose in the relation shown. The tapered end of the faucet extension member is then inserted between the pawl levers 3 and within the sleeve 4. As the members are shoved tightly together the ends of the pawl will snap over shoulder 2 and therefore secure the device against separation as shown in Fig. 1. In order to loosen the hose from the faucet it is only necessary to depress the outer ends of pawl levers 3 therefore disengaging the inner ends with the shoulders 2 which allows the sleeve to separate from the faucet connection member 1. My device is quickly and easily applied, requires no wrench and will maintain itself water tight.

While I have shown a particular form of embodiment of my invention, I am aware that many minor changes therein will readily suggest themselves to others skilled in the art without departing from the spirit and scope of the invention, and I therefore desire to avoid being limited to the exact form shown and described.

Having described my invention, what I claim as new and desire to protect by Letters Patent, is:—

In the device of the class described, the combination of a faucet extension member which is adapted to be secured to the end of a faucet, an annular under cut shoulder integral with the faucet extension member, a tapered portion on the extreme outer end of the faucet extension member, a chambered hose extension member of which the internal diameter of the chambered portion is of greater diameter than the external diameter of the tapered portion of the faucet extension member, a sleeve adjustably secured within the end of the chambered portion of the said hose extension member and slidably fitting over the outer portion of the said

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faucet extension member, pawl levers pivotally secured to the said sleeve members and adapted to engage the shoulder upon the faucet extension member, a tapered gasket intermediate the tapered portion of the faucet extension member and the inner walls of the chambered portion of the hose extension member, and spring means for normally maintaining the gasket in tight relationship between the said members.

In testimony whereof I affix my signature.

NELS ULLELAND.

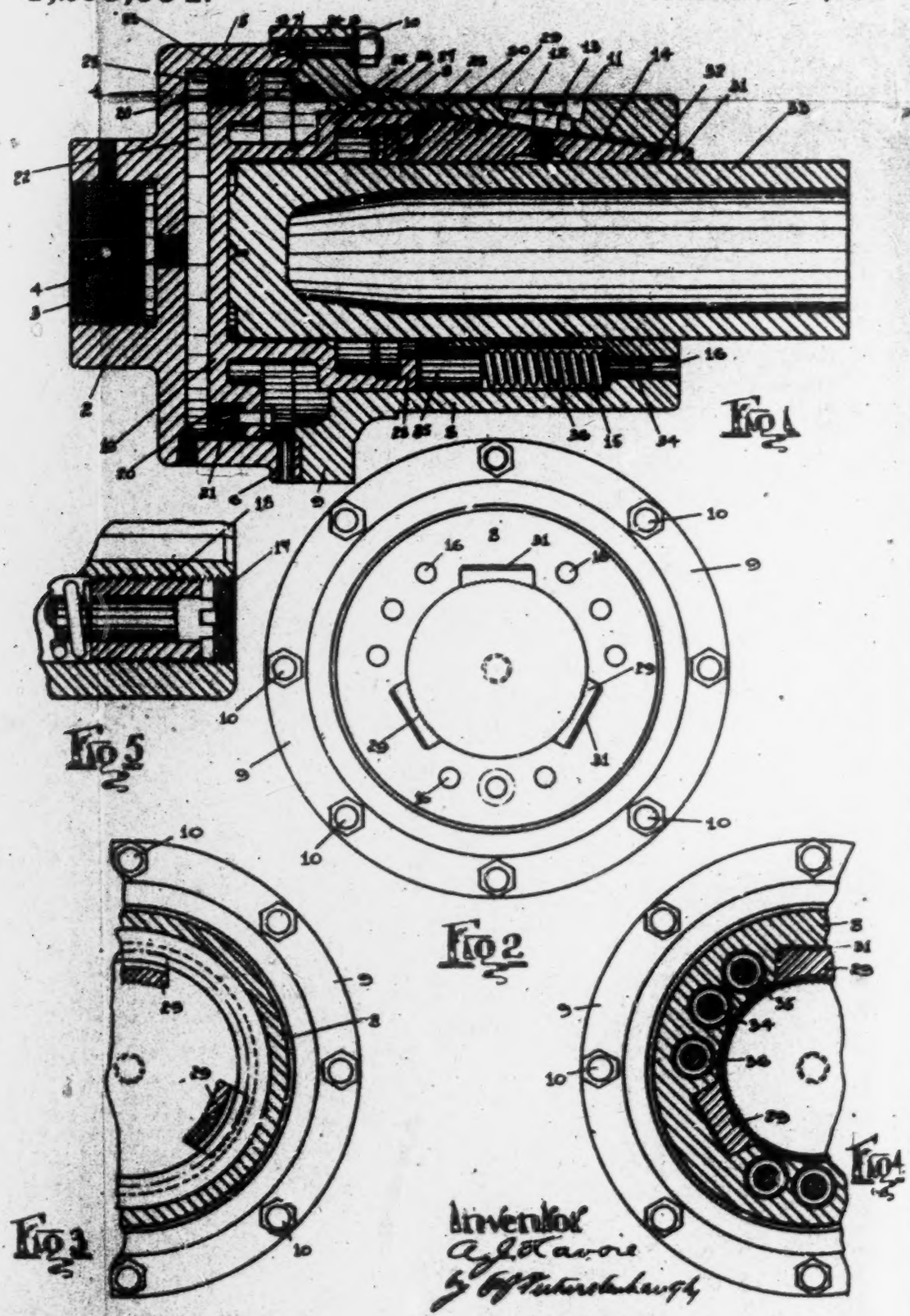
520

A. J. LAVOIE.

CHUCK.

APPLICATION FILED JUNE 8, 1918.

1,295,994. Patented Mar. 4, 1919.



Inventor
A. J. Lavoie
by [illegible]
Attorney

UNITED STATES PATENT OFFICE.

ALPHONSE JOSEPH LAVOIE, OF MONTREAL, QUEBEC, CANADA.

CHUCK.

1,295,994. Specification of Letters Patent. Patented Mar. 4, 1919.

Application filed June 8, 1918. Serial No. 239,693.

To all whom it may concern:

Be it known that I, ALPHONSE JOSEPH LAVOIE, a subject of the King of Great Britain, and resident of 154 Prud'homme avenue, in the city and district of Montreal, in the Province of Quebec, in the Dominion of Canada, have invented certain new and useful Improvements in Chucks, of which the following is a specification.

The invention relates to improvements in chucks as described in the present specification and illustrated in the accompanying drawings that form part of the same.

The invention consists essentially in the novel arrangement and construction of parts whereby the gripping members are operated in a manner conformable with the best results regarding the engagement of the grip members simultaneously.

The objects of the invention are to facilitate the operations of the mechanic in lathe and like work, so that he will be enabled to handle his piece of work quickly and efficiently, to devise a chuck that may be used almost universally in turning and such machine work, and generally to provide a chuck cheap to manufacture and durable in its construction.

In the drawings Figure 1 is a longitudinal mid-sectional view, showing a piece of work engaged by the clamping jaws.

Fig. 2 is an end elevation of the chuck.

Fig. 3 is a cross sectional view showing the annular chamber for the reciprocation of the jaw members.

Fig. 4 is a cross sectional view through the return spring rods casing and jaws adjacent to the end.

Fig. 5 is an enlarged detail of the adjusting means for the return springs.

Like numerals of reference indicate corresponding parts in each figure.

Referring to the drawings, the head 1 of the chuck is formed with the hollow shaft socket 2, said socket being threaded internally at 3 and having in the bed thereof a threaded opening 4 leading through the wall of said head.

The side wall 5 is in the form of an annular flange from the head 1 and at the extremity has the annular boss 6, into which the screw holes 7 extend.

The jaw casing 8 is formed at its inner end with the flaring rim 9, through which the screw bolts 10 hold the casing 8 to the boss 6.

The casing 8 extends outwardly and is recessed at 11 intermediate of the length thereof, said recesses having the slots 12 through the bed thereof, in which the screws 13 slide.

The jaw recesses 14 are formed in the inner wall of said casing 8 and the beds of said recesses are inclined from the axis of the casing and head, said inclines rising from the outer end to form wedge surfaces for the gripping jaws in their outward movement.

The compression spring chambers 15 are also formed in the casing 8, in groups alternating with the jaw recesses 14, said chambers terminating in the outer end in the rod holes 16, or as shown in Fig. 5, terminating in the threaded outer ends 17, in which the adjusting plugs 18 are inserted for adjusting the springs inclosed in said chambers.

A piston 19 is introduced into the interior of the head 1 previous to the attachment of the jaw casing and the packing ring 20 and packing 21 are secured to said piston at the outer edge to complete the air tight expansion chamber 22.

At the outer edge, the flange 23 extends outwardly forming the side wall of the piston, said wall or flange 23 reciprocating in the annular chamber 24. The central cylindrical wall 25 is concentric with the outer wall 23 and extends to the offset 26 from which in enlarged form 27 it extends to annular inturned flange 28, adapted to engage the jaws 29 in the recesses 30, said jaws being arranged in the jaw recesses 14 and preferably having the plates 31 mounted on the backs thereof for adjusting purposes, the plates 31 being held in place by the pins 32 entering corresponding pin holes in said jaws.

It will be seen by the above description that the jaws 29 to enter the recess 14 must be of tapering form, that is to say, they must have the backs inclined in relation to the straight gripping fronts so as to wedge between the work and the inclined surfaces of said recess 14; consequently, when pressure is brought to bear on the piston head, the cylindrical wall 25, being part of said piston head, and forming a socket, is thrust outwardly, and as said flange 28 engages the jaws 29, the said jaws are also thrust outwardly against the inclined inner walls 14, the tendency of said jaws being to form a wedge between the walls 14 and the piece of work in the chuck, here shown as the shell

33, in the socket 25 and extending outwardly between said jaws.

The rods 34 extend from the rod holes 16 into the spring chambers 15 and at their other ends within said spring chambers carry the heads 35. The spiral springs 36 encircle said rods 34 between the heads 35 and the end walls of the chambers 15.

The springs 36 exert a constant inward pressure on the heads 35 and these heads abut the flange 28 between the jaw recesses 14, thereby forcing the piston continuously toward the head 1.

The threaded opening 4 is the inlet to the expansion chamber 23 and this inlet is connected to a compressed air pipe, which extends through the sleeve 2 and other parts of the machine, on which the chuck is mounted, to a compressed air supply. As soon as the air is turned on it flows into the chamber 23 and exerts a considerable force on the piston 19 which, as explained hereinbefore, moves the jaws against the inclined inner wall of the chuck casing and consequently against the work.

The release of the air pressure effects the release of the jaws, as the springs 36 return the piston to its original position, thereby loosening the jaws so that the work can be readily removed.

The screws 13 anchor the jaws 29 to the casing 8 through the slots 12, though they do not interfere with the longitudinal movement of said jaws.

It will be noticed that the jaw recesses 14 extend from the outer end of a concentric annular surface, said surface forming the inner wall of a cylindrical alining chamber and the enlarged portion 37 of the central extension from the piston engages said inner wall and thereby alines the gripping members with the socket formed by the central cylindrical wall 25 forming the inner part of the extension.

Various changes may be made in the construction and arrangement of the parts included in this device, without departing from the spirit of the invention, so long as they are within the scope of the claims for novelty following.

What I claim is:—

1. In a chuck, a housing in two parts bolted together and having a common axis, the inner part forming an expansion chamber and having a fluid opening in the head thereof, and the outer part having a plurality of longitudinal recesses with inclined beds, a piston operating in said expansion chamber and having an integral, cylindrical and inner central wall projecting outwardly therefrom and forming a socket for the work, said projection being enlarged at the outer end and forming an annular flange spring-held inwardly, and jaws in said recesses having correspondingly inclined backs and transverse grooves at the inner end receiving said annular flange.

2. In a chuck, a housing in two parts, forming an expansion chamber, cylindrical chamber and a wedging casing, securely fastened together and having an inlet opening through the head of said expansion chamber, said wedging casing having jaw recesses with wedging beds, jaws in said recesses, a piston operating in said cylindrical chamber and suitably packed and having a concentric and inner cylindrical wall terminating in an enlarged inwardly flanged outer end and engaging said jaws, and compression springs introduced in the wall of said wedging casing between said jaws and exerting a constant pressure on the outer extremity of said concentric wall counter to the fluid pressure on said piston.

3. In a chuck, a housing in two parts, forming a fluid expansion chamber, a cylinder body and a wedging casing, the latter having longitudinal recesses with inclined beds and openings through said beds into slots from the outer side, jaws correspondingly formed and wedging on to the work from said recesses and having transverse grooves at their inner ends, a piston operating in said cylindrical head and having a central cylindrical outward projection of lesser diameter and terminating in an offset portion forming an annular flange engaging said transverse grooves, springs inserted in corresponding holes in the solid portions of the wall between said jaw recesses and engaging said piston and adjusting screw pins engaging said jaws through said openings.

4. In a chuck, a housing in two parts forming an expansion chamber at the head end and a jaw containing member at the outer portion, said jaw containing member having an annular wall forming a chamber of lesser diameter than said expansion chamber and concentric therewith, a piston having an outer side wall engaging the wall of said expansion chamber and an integral central extension, offset and beyond said offset forming an annular wall engaging the aforesaid annular wall and alining the chuck, jaws in said jaw containing member engaged by the extremity of said central extension and springs in constant engagement with said integral extensions and returning said piston to its original position following each forward movement.

5. In a chuck, a housing in two parts having a common axis, said parts forming an expansion chamber and an alining chamber respectively, jaws contained in the outer part and adapted to wedge to the work, and a piston spring-held toward the head and having an integral central concentric extension therefrom forming a rigid central socket substantially flush with said jaws

and offset to form an alining surface engaging the wall of said alining chamber and at the extremity of said alining surface formed to engage said jaws.

6. In a chuck, a housing in two parts having a common axis, the inner part forming a head and an expansion chamber and the outer part forming a jaw container and alining surfaces, jaws in said jaw container, a piston having a central outward extension engaging said alining surfaces and inwardly turned at the extremity forming a flange engaging said jaws, and springs in said container arranged in corresponding chambers alternating with said jaw recesses said springs operating on a headed rod engaging said flange and being adjustable in regard to the pressure exerted on the piston.

Signed at the city of Montreal, Canada, this 4th day of June, 1918.

ALPHONSE JOSEPH LAVOIE.

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F. D. WINKLEY.

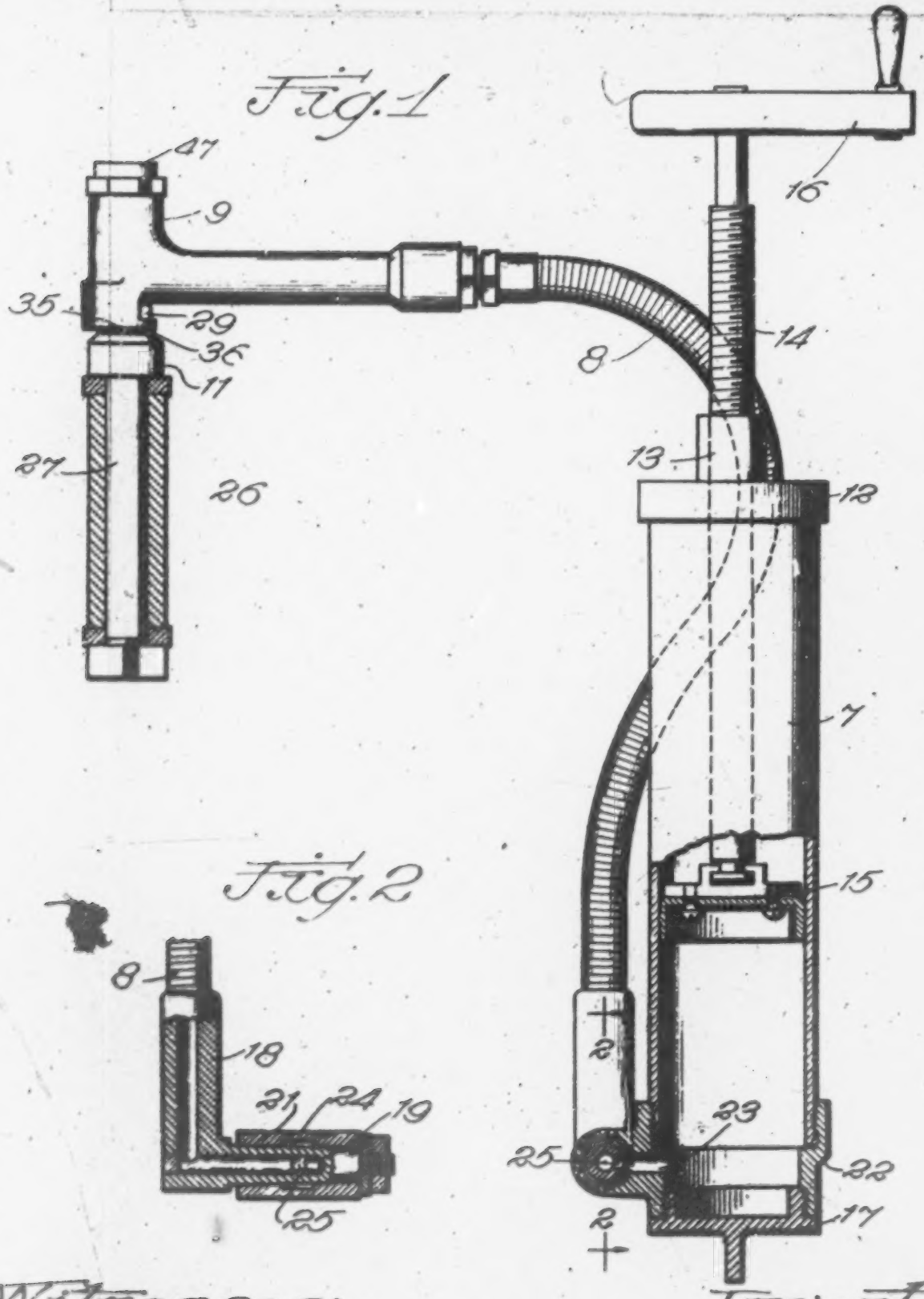
LUBRICATING SYSTEM.

APPLICATION FILED OCT. 7, 1918.

Reissued June 10, 1919.

14,667.

2 SHEETS—SHEET 1.



Witnesses:
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Earl F. Pierce

Inventor
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By Williams, Bradbury & Co
Attys.

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F. D. WINKLEY.

LUBRICATING SYSTEM.

APPLICATION FILED OCT. 7, 1918.

Reissued June 10, 1919.

14,667.

2 SHEETS—SHEET 2.

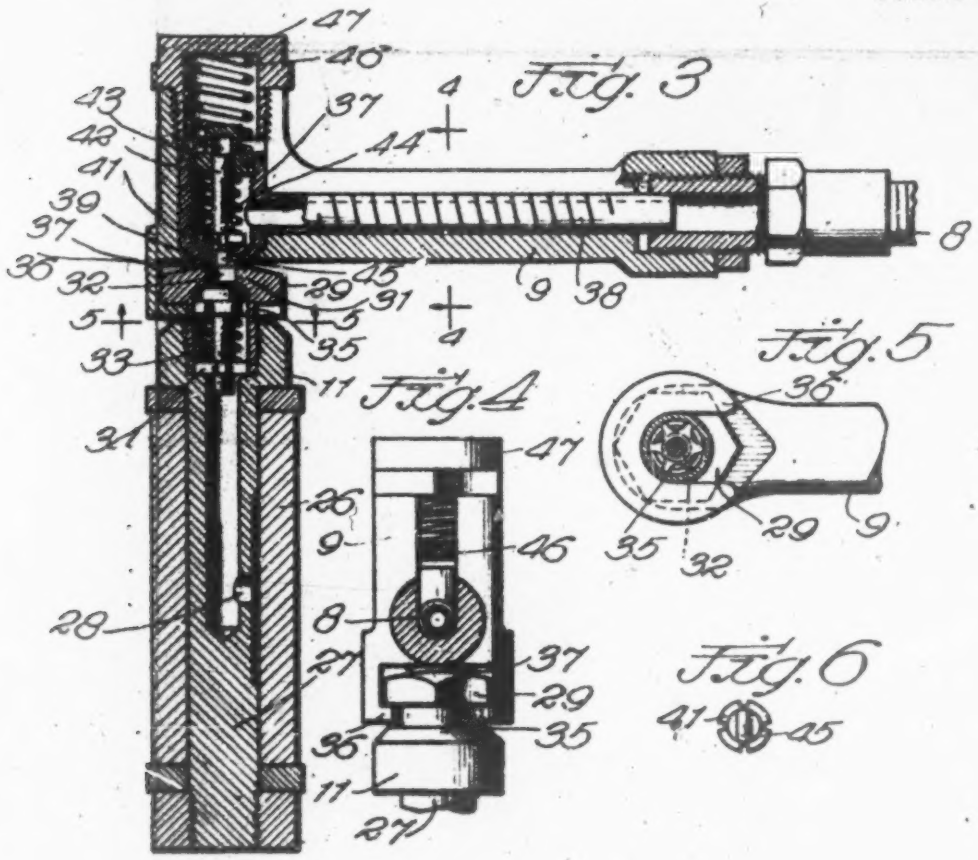

Fig. 3

Fig. 4

Fig. 5

Fig. 6

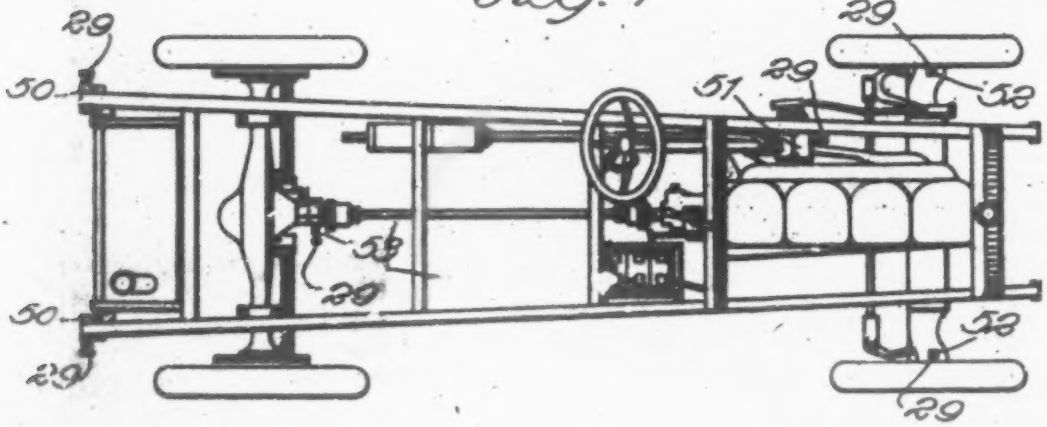

Fig. 7

Witnesses:
Andrew Watson
Earl A. Pierce

Inventor
Frank D. Winkley
By Williamson, Bradbury & Lee.
Attys

UNITED STATES PATENT OFFICE.

FRANK D. WINKLEY, OF MADISON, WISCONSIN.

LUBRICATING SYSTEM.

14,667. Specification for Reissued Letters Patent. Reissued June 10, 1919.

Original No. 1,201,414, dated October 17, 1916, Serial No. 94,616, filed May 1, 1916. Application for reissue filed October 7, 1918. Serial No. 257,200.

To all whom it may concern:

Be it known that I, FRANK D. WINKLEY, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented certain new and useful Improvements in Lubricating Systems, of which the following is a specification.

This invention relates in general to lubricating systems and has more particular reference to a system for lubricating the various minor bearings, such as the spring-bolts, brake-operating-mechanism, steering mechanism, etc., of a motor car.

Prior to my invention it has been customary to equip the various bearings of this character with grease cups from which grease was delivered to the bearings by screwing down the cups. It has been found, however, that grease is not entirely suitable as a lubricant for bearings of this character for the reason that it soon becomes mixed with abrasions from the working surfaces and other foreign matter, and hardens so that it fills up the oil passages and prevents adequate lubrication of the parts.

My present invention is designed to provide a lubricating system in which a fluid lubricant may be employed and by which it may be readily forced into the bearings under pressure so as to insure an adequate lubrication of the working parts.

Another object of my invention is to provide an improved oil receptacle as a part of the bearing to be lubricated, and to provide an oil supply nozzle which can be readily attached to and detached from the oil receptacle, and which, when attached, will form an oil-tight joint through which oil may be forced into the receptacle and to the bearings.

Another object of my invention is to provide a lubricating system embodying a flexible conduit and a swivel connection between the conduit and container or pressure cylinder, so that the nozzle carried by the conduit can be placed in any desired position so as to be readily attached to the oil receptacles of the various bearings on the car.

Still another object is to provide a system of this character which will be simple in construction, cheap to manufacture and easy to manipulate, and which will positively force the oil under any required pressure to the interior of the bearing to be oiled.

Various other objects and advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following description when considered in connection with the accompanying drawings. Referring to the drawings—

Figure 1 is a side elevation partially in section, of a lubricating system embodying my invention;

Fig. 2 is a fragmentary section view on the line 2—2 of Fig. 1,

Fig. 3 is an enlarged sectional view through the nozzle and the oil receptacle,

Figs. 4 and 5 are sectional views on the lines 4—4 and 5—5 of Fig. 3,

Fig. 6 is an end view of the nozzle valve, and

Fig. 7 is a conventional plan view of an automobile chassis equipped with my lubricating system.

From the drawings it will be observed that my novel system comprises primarily an oil container or pump 7, a flexible conduit 8 equipped with a nozzle 9, and an oil receptacle 11 which forms a part of each bearing to be oiled.

More specifically the container 7 comprises a cylinder, as shown in Fig. 1, equipped at its upper end with a cap 12 having a tapped boss 13 through which the piston rod or spindle 14 is threaded. The lower end of this rod is rotatably connected to a piston or plunger 15 and the upper end is equipped with a handdle 16 by means of which the rod may be turned to move the piston longitudinally in the cylinder. The lower end of the cylinder is closed by a large removable cap 17, which may be unscrewed so that the cylinder can be filled with oil by holding it in inverted position beneath a faucet or other source of oil supply.

The flexible conduit 8 is connected with the container through a swivel joint which together with the flexibility of the conduit enables the nozzle 9 to be moved about to any desired position with respect to the container for attachment to the various oil receptacles on a car. By referring to Figs. 1 and 2 it will be observed that the conduit 8 emanates from a shank 18 having a laterally extending hollow trunnion 19 which is journaled in a hollow boss 21 formed integral with the bottom member 22 of the container. A passage way 23 leading from the container

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into the hollow boss terminates in an annular groove 24 which communicates with the interior of the trunnion 19 through a port 25.

The bearing, designated generally by reference character 26, in which my improved oil receptacle is embodied, comprises a hollow spindle 27 having an outlet port 28 through which oil is supplied to the surfaces to be lubricated. The upper end of the spindle, instead of being equipped with a grease cup, as has been customary prior to my invention, is provided with a head 29 which is threaded into the enlarged upper end of the spindle 27. This head has an oil receiving opening 31 in its top which is normally closed so as to exclude dust and dirt by a valve 32 which is machined to snugly fit the aperture. A coiled expansion spring 33 interposed between the lower face of the valve disk and a spider 34 disposed in the lower end of the shank 35 of the head normally retains this valve in closed position. It will be observed from Fig. 3 that the upper end of the valve lies flush with the upper face of the head so that the end of a bearing equipped with my oil receptacle presents a smooth and attractive appearance which is not complicated or disfigured by any permanent grease cup.

The free end of the flexible conduit 8 is threaded into the nozzle 9 which is shaped to provide on the bottom of its outer end a bifurcated portion 36 adapted to straddle the shank 35 of the oil receptacle head and to be engaged beneath this head, as shown in Fig. 3. Within the nozzle proper there is mounted what I term an oil cup 37 which communicates with the conduit 8 through a branch conduit 38. This cup has its lower end shaped to project outwardly beyond the plane of the nozzle proper toward the bifurcated portion 36, and this lower wall of the cup is equipped with a discharge aperture 39 which is normally closed by a valve 41 carried on a stem 42 which extends upwardly into a cap 43 threaded into the upper end of the cup. An expansion spring 44 surrounding the stem normally holds the valve in closed position, and when closed an extension 45 beneath the valve disk projects downwardly beyond the bottom of the cup. It will be observed from Fig. 6 that this extension 45 extends diametrically entirely across the discharge aperture 39 and is wider than the oil-receiving aperture 31 in the head 29 so that it will engage the head on both sides of the aperture when the nozzle is connected to the head.

The oil cup 37 is yieldingly mounted in the nozzle proper and is held downwardly therein with its bottom projecting beyond the plane of the nozzle proper by a relatively stiff expansion spring 46 interposed between the cap 43 of the cup and a cap 47 threaded into the top of the nozzle body. The lower end of the cup is therefore held in its lowermost position and the valve is normally maintained in closed position by the spring 44.

When it is desired to use my improved system the nozzle is attached to the head of the oil receptacle to which it is desired to deliver lubricant by engaging the bifurcated portion 36 of the nozzle beneath the head and sliding the nozzle transversely of the head or toward the right, viewing Fig. 3, into the position shown in this figure. The engagement of the extension 45 with the top of the head will open the valve 41 and the cup will yield upwardly against the spring 46 sufficiently to accommodate the device to heads of various thicknesses, but this spring will hold the bottom of the cup snugly against the head of the oil receptacle so as to provide an oil-tight joint at this point. After the nozzle has been attached the handle 16 is turned to force the plunger 15 downwardly in the container, thereby forcing oil under pressure through the conduit into the oil cup 36 and downwardly into the oil receptacle, the valve 32 in the receptacle being opened against the force of the spring 33 by the pressure of the inflowing oil. When sufficient lubricant has been delivered to the bearing a partial reverse rotation of the handle 16 will relieve the pressure in the cup and permit the valve 32 to close. The nozzle may then be detached from the head by slipping it off laterally, and as soon as the pressure against the extension 45 is released the valve 41 will be closed by its spring 44.

In Fig. 7 I have illustrated a conventional form of an automobile chassis equipped with my lubricating system. In this figure the spring-bolts 50, steering mechanism 51, steering knuckles 52, and propeller shaft bearing 53 are shown equipped with my lubricant heads 29. It is, of course, obvious that these lubricating heads may be used at any other points on the machine where it is desired to supply a lubricant to a bearing.

It will be obvious from the foregoing that I have provided a lubricating system in which the discharge nozzle can be very quickly attached to and detached from an oil-receiving receptacle of simple and economical construction, that the oil can be forced by my system positively into the receptacle and bearing in any desired quantities, and that when the system is not in use all leakage is precluded since the valve 41 is maintained at all times against its seat except when positively unseated by the act of attaching the nozzle to a properly constructed head. While I prefer to equip the bearings to be lubricated with oil receptacles of the character described, to which my improved nozzle may be detachably connected, it should be obvious that the oil re-

ceptacles could be structurally independent of the bearings if preferred and could be attached to the bearings at the time of oiling and detached therefrom after each oiling operation if preferred, the opening into the bearing being closed in the interim by a suitable plug.

It is believed that the construction and operation of my improved lubricating system will be understood from the foregoing without further description. While I have described my invention as particularly useful for supplying fluid lubricants to the bearings of mechanism it is, of course, obvious and to be understood that my invention is not limited to the use of the more fluid lubricants but can be employed for delivering any of the less fluid lubricants to a bearing. It is only necessary that the lubricant be sufficiently fluid to permit it to be discharged from the pump or container 7 into the head or receptacle 29. It should be also manifest that my invention is not restricted to the details of construction illustrated and described, as these details are capable of considerable modification and variation without departing from the scope of the invention as defined in the following claims.

I claim:

1. In a lubricating system, the combination of an oil receptacle having an oil-receiving opening, a valve normally closing said opening, a nozzle adapted to be detachably connected to said receptacle so as to form a tight joint with the receptacle, said nozzle having a delivery orifice arranged to aline with said opening in the receptacle when the receptacle and nozzle are connected, a valve mounted in said nozzle and constructed to be opened when the nozzle is connected to the receptacle, and means for supplying lubricant to said nozzle.

2. In a lubricating system, the combination of an oil receptacle having an oil-receiving opening, a valve normally closing said opening, a nozzle having an oil cup yieldingly mounted therein, said oil cup being provided with a delivery orifice, a valve normally closing said orifice, means whereby said nozzle and oil receptacle may be detachably connected together, and means for supplying lubricant to said oil cup.

3. In a lubricating system, the combination of an oil receptacle provided with a valved head, a nozzle provided with a bifurcated portion adapted to engage beneath said head, an oil cup yieldingly mounted in said nozzle and normally urged into engagement with said head when the parts are connected so as to form a tight joint between said head and the cup, and means for delivering lubricant through said cup to said receptacle.

4. In a lubricating system, the combination of an oil receptacle provided with a valved oil-receiving opening, a nozzle provided with a bifurcated portion having a discharge orifice and an oil cup yieldingly urged toward said bifurcated portion, a valve normally closing the discharge orifice from said cup, said valve being constructed to be opened when said nozzle is connected to said receptacle, and means for supplying lubricant to said nozzle.

5. In a lubricating system, the combination of a nozzle provided with means for detachably connecting the same to an oil receptacle, a cup yieldingly mounted in said nozzle and provided with a discharge orifice, a valve normally closing said orifice and having an extension through the orifice by which the valve is opened when the nozzle is connected to an oil receptacle, and means for supplying lubricant to said cup.

6. In a lubricating system, the combination of a nozzle comprising a yieldingly mounted oil-delivery device provided with a discharge orifice, a valve normally closing said orifice, and means for attaching said nozzle to an oil receptacle and simultaneously opening said valve.

7. In a lubricating system, the combination of a container, a flexible conduit connected to said container, a nozzle carried by the free end of said flexible conduit, a normally closed valve controlling the discharge orifice from said nozzle, and an oil receptacle constructed for detachable connection to said nozzle, said receptacle being adapted to open said nozzle valve when connection between the nozzle and said receptacle is established.

8. In a lubricating system, the combination of a container, a flexible conduit, a swivel connection between said conduit and said container, a headed oil receptacle, and a valve nozzle carried by said conduit and constructed for detachable locking connection with said oil receptacle by movement of said nozzle transversely of the receptacle.

9. The combination with a lubricant receptacle, of means for supplying lubricant thereto comprising a conduit, coacting means on said receptacle and said conduit for detachably connecting one end of said conduit with said lubricant receptacle comprising two relatively movable parts, one of said parts serving to secure said conduit to said receptacle and the other of said parts sealing the joint between said conduit and said receptacle, and means connected with the other end of said conduit for supplying lubricant thereto.

10. The combination with a lubricant receptacle, of means for supplying lubricant thereto comprising a conduit, means for detachably connecting one end of said conduit with said receptacle comprising a member secured to said conduit and a second mem-

ber movable relatively to said first named member for contacting with an outer surface of said receptacle to maintain a fluid tight connection between said receptacle and said conduit.

11. The combination with a mechanism comprising a variety of bearings located at different points thereof, each bearing being provided with an aperture for receiving lubricant, of means for supplying lubricant to said apertures comprising a flexible conduit, means for successively attaching one end of said conduit with said apertures, and means for supplying lubricant under pressure to the other end of said conduit.

12. The combination with a lubricant receptacle of means for supplying lubricant thereto, under pressure, comprising a conduit having means for detachably securing it to said receptacle, a perforated member yieldably mounted in said first-named means for contacting with one end of said receptacle to seal the connection between said conduit and said receptacle, and spring means for yieldingly holding said yieldably-mounted means in contact with said receptacle

13. The combination with a lubricant receptacle of means for supplying lubricant thereto under pressure, comprising a conduit havin, means for detachably securing it to said re.ptacle, a perforated member yieldably mounted in said first-named means, for contacting with said receptacle to seal the connection between said conduit and said receptacle, and spring means for yieldingly holding said yieldably-mounted means in contact with said receptacle.

14. The combination with a lubricant receptacle of means for supplying lubricant thereto under pressure, comprising a conduit having means for detachably securing it to said receptacle, and a perforated member yieldably mounted in said first-named means for contacting with said receptacle to seal the connection between said conduit and said receptacle.

15. The combination with a lubricant receptacle of means for supplying lubricant thereto under pressure comprising a conduit having means for detachably securing it to said receptacle, and a yieldable member for contacting with said receptacle and sealing the connection between said receptacle and said conduit.

16. The combination with a mechanism comprising a variety of bearings located at different points thereof, each bearing being provided with a lubricant receptacle, of means for supplying lubricant to said receptacles comprising a flexible conduit, means for successively attaching one end of said conduit with said receptacles, and means for supplying lubricant to the other end of said conduit under pressure.

17. The combination with a mechanism comprising a variety of bearings located at different points thereof and at different angles, each bearing being provided with an aperture for receiving lubricant, of means for supplying lubricant to said apertures comprising a conduit adapted to be flexed to reach the said apertures, quick detachable means for successively attaching one end of said conduit with said apertures comprising means for sealing the connection between said conduit and said bearings against the escape of lubricant, and means attached to the other end of said conduit for supplying lubricant thereto under pressure.

FRANK D. WINKLEY.

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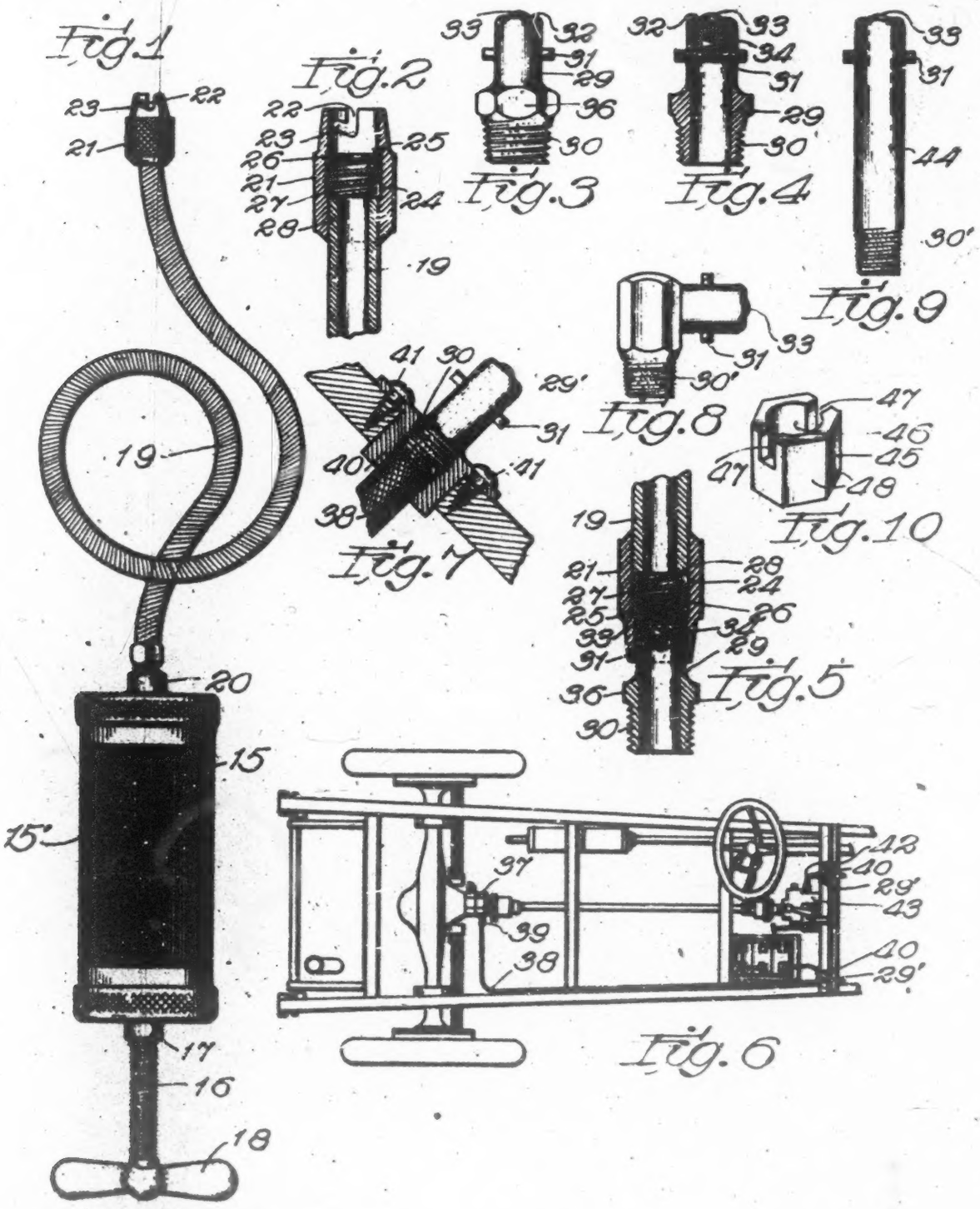
A. V. GULLBORG.

LUBRICATING MEANS.

APPLICATION FILED DEC. [illegible] 1913

1,307,734. Patented June 24, 1919.



Witnesses:
Andrew Wintercorn
Earl F. Pierce

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UNITED STATES PATENT OFFICE.

ARTHUR V. GULLBORG, OF CHICAGO, ILLINOIS.

LUBRICATING MEANS.

1,307,734. Specification of Letters Patent. Patented June 24, 1919.

Application filed December 21, 1918. Serial No. 267,858.

To all whom it may concern:

Be it known that I, ARTHUR V. GULLBORG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Lubricating Means, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to lubricating means, and is especially concerned with means for supplying suitable lubricants to parts of machines or apparatus requiring lubrication where these parts are difficult to gain access to, and is further concerned with the provision of apparatus for supplying lubricants under pressure to movable parts, the said means comprising a grease pump or gun provided with means for detachably connecting it with the various parts to be lubricated.

The objects of my invention are:

1st. To provide novel means for supplying a lubricant under pressure to the parts of an apparatus to be lubricated, the said means comprising a grease pump or gun and means for detachably connecting the discharge of said grease pump or gun with the part to be lubricated.

2nd. To provide novel coupling means for connecting the grease gun with the parts to be lubricated, the said coupling means being so constructed that when the coupling members are uncoupled or disconnected from each other there will be no excess lubricant on the outer ends of the coupling members.

3d. To provide novel means for effectively sealing the joint between the coupling members so that the lubricant may be forced between the parts to be lubricated under a very heavy pressure.

4th. To provide novel means whereby lubricant may be supplied to parts to which it is difficult to gain access.

5th. To provide novel coupling members to be permanently secured to the parts to be lubricated.

6th. To provide novel means to assist in attaching and detaching a tubular coupling member to a part to be lubricated.

Further objects will appear as the description progresses, reference being had to the accompanying drawing in which,

Figure 1 is a side elevation showing my improved grease gun;

Fig. 2 is a longitudinal section through the coupling member thereof;

Fig. 3 is a side elevation of one type of coupling member adapted to be secured to the part to be provided with lubricant and co-acting with the coupling member of my grease gun for connecting the discharge outlet of the grease gun with the part to be lubricated;

Fig. 4 is a longitudinal section of the structure shown in Fig. 3;

Fig. 5 is a longitudinal section through the coupling members shown in Figs. 2 and 4, but taken on a plane at right angles to the section plane of Figs. 2 and 4 showing the two coupling members united;

Fig. 6 is a more or less conventional plan view of an automobile with the body thereof removed showing the novel means which I provide for conveying lubricant to parts ordinarily difficult to gain access to, the front portion of the automobile chassis being broken away;,

Fig. 7 is a sectional view showing the means for securing my coupling members to the ends of the conduits for conveying lubricant to the parts difficult of access;

Fig. 8 is a side elevation of a modified form of coupling member;

Fig. 9 is a side elevation of a still further modification of my coupling member; and

Fig. 10 is a perspective view of the means which I employ for rotating the coupling members shown in Fig. 9 in either direction to attach it to or detach it from the part to be provided with a lubricant.

Similar characters of reference refer to similar parts throughout the several views.

Referring to the drawings, the reference character 15 indicates the barrel of my improved grease gun or pump which is provided in a wellknown manner with a plunger, not shown, which is reciprocated in the barrel 15 by means of a screwthreaded piston rod 16 which co-acts with a screwthreaded nut 17, the piston 16 being provided with a handle 18. The barrel 15 is provided with ribs or corrugations 15′ to insure a firm grip of the hand thereon. A flexible conduit 19, of any suitable and wellknown construction, has one end secured to the discharge outlet 20 of my pump and the other end is provided with a hollow coupling member, indicated in general by the reference character 21. The free end of this coupling member, as shown in Fig. 2, is provided with a

bayonet slot 22, the transverse portion 23 of which is inclined from the inner end of the longitudinal portion of the slot toward the outer end of the coupling member for a purpose which will be referred to later on. The bore of the coupling member is enlarged at 24 to provide an annular shoulder 25. A perforated cup leather or sealing disk 26 is slidably mounted in the annular portion 24 of the bore of the coupling and is urged against the shoulder 25 by means of a coiled spring 27, one end of which abuts against the cup leather or sealing disk 26 and the other end of which abuts against the adjacent end 28 of the conduit 19. This end of the conduit may be soldered or secured in any convenient manner to the coupling member.

Referring to Figs. 3 and 4, the reference character 29 indicates as a whole a second coupling member which co-acts with the coupling member just described. This coupling member is in general tubular in form and is provided at one end with screwthreads 30 for securing it to the part to be lubricated. A pin 31 extends through and projects from the opposite sides of the other end of the tubular member. This end of the tubular member is flanged inwardly, as indicated at 32, to form a valve seat with which the hollow capsule shaped valve 33 co-acts. A spring 34 interposed between the pin 31 and the hollow valve 33 urges the latter against the valve seat 32. My purpose in making the valve 33 hollow is, first, to provide sufficient room for the spring 34 without materially increasing the length of the coupling member, and, second, to provide means which will tend to prevent the spring 34 from buckling or flexing longitudinally when the valve 33 is pushed inwardly to admit the lubricant. My invention contemplates the provision of facets 36 to receive the jaws of a wrench whereby the coupling member may be attached to or detached from the parts to be lubricated.

In Fig. 5 I have shown the coupling members 21 and 29 coupled together. In this position it will be noted that the spring 27 is partially compressed and that the sealing disk 26 is displaced from the annular shoulder 25 by the end of the coupling member 29. When the piston of the gun pump is actuated to force lubricant through the conduit 19 under pressure this pressure will cause the sealing disk 26 to seal the joint between the two coupling members and thus prevent any escape of lubricant over the sides of the coupling member 29. On account of the fact that the transverse portion 23 of the bayonet slot in the coupling member 21 is inclined toward the open end of this coupling member it is necessary in order to detach this coupling member from the coupling member 29 to move it toward the coupling member 29. This movement causes an additional small quantity of lubricant to be forced into the coupling member 29. When the coupling member 21 is then turned to permit the pin 31 to slide in the longitudinal portion of the slot 22 the sealing disk 26 is moved toward the end of the coupling member 29 under the pressure of the spring 34. This causes the sealing disk 26 to move toward the outer end of the coupling member 21 and thereby produces a slight vacuum which causes any grease which might otherwise remain on the outer end of the coupling member 29 or the outer side of the valve 33 to be sucked back behind the sealing disk 26, and thereby prevents any excess of lubricant from remaining on the end of the coupling member 29 or on the outside of the valve.

From the above description it will be seen that I have provided means for conveying a lubricant to the part or parts to be lubricated which not only prevents the loss of lubricant, even though the lubricant may be forced between the bearing surfaces under very high pressure, but also prevents the lubricant from remaining upon exposed portions of the coupling members after these have been uncoupled, and subsequently lost. This feature is of importance where, as I will describe later on, the coupling members are located at readily accessible points and where, in case the parts being lubricated form a part of a motor vehicle or other similar structure, the clothes of the operator are likely to come in contact with these coupling members.

Referring to Fig. 6 in which I have disclosed a portion of a motor vehicle with the body thereof removed, the reference character 37 indicates a bearing in the differential casing which is supplied with lubricant by a conduit 38 connected therewith by a suitable hollow coupling 39. The other end of the conduit 38 is brought forwardly in the vehicle and is secured to either the dash or the instrument board, as may be found convenient, by means of a floor socket 40, shown in detail in Fig. 7, which is secured in place by means of the screws 41 and is provided with an internal screwthread for receiving the screwthreaded portion 30 of a coupling member 29'. This coupling member 29' is similar to that shown in Figs. 3 and 4, except that it is not provided with the facets 36 for receiving the jaws of a wrench. The forward end of the conduit 38 may be soldered or otherwise secured in the socket 40. The reference character 42 indicates another conduit for conducting oil from the coupling member 29' to the transmission housing 43.

While I have illustrated means for conducting lubricant to but two portions of this automobile vehicle it is to be under-

stood that conduits similar to 38 and 42 may be used for conducting lubricant to any portion of the vehicle which it is desired to lubricate. Furthermore, this feature of my invention is not to be limited to means for lubricating motor vehicles, but is capable of being used for lubricating any apparatus whether the parts to be lubricated are or are not difficult of access.

In Fig. 8 I have shown a modified form of a coupling member to be secured to a part to be lubricated. This coupling member is L shaped and one end thereof is provided with screwthreads 30' and the other end thereof being provided with a pin 31 and a spring-pressed valve or closure 33 similar to that described in connection with Figs. 3 and 4. The purpose of this coupling member is to provide means for connecting the coupling member 21 with a part to be lubricated which would otherwise be difficult of access if provided with a straight coupling member such as that shown in Figs. 3 and 4.

In Fig. 9 I have disclosed a still further modification of my coupling member wherein it is formed from a tubular member 44 of substantially constant diameter which is not provided with means for co-acting with a wrench to attach or detach it to the part to be lubricated. In order to thus attach or detach this member I provide the means illustrated in Fig. 10. This means comprises a sleeve-like member 45 having a bore 46 therein for receiving the tubular member 44 and slots 47 for receiving the ends of the pin 31 of the tubular member 44. The member 45 is provided with facets 48 for co-acting with a wrench or other tool for rotating this sleeve.

While I have described the preferred embodiments of my invention it is to be understood that it is capable of other adaptations and modifications within the scope of the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. The combination with a hollow coupling member having a pin projecting from one side thereof and a spring-pressed closure, of a pump having a flexible conduit connected with the outlet thereof, a second hollow coupling member secured to the other end of said conduit for receiving the closed end of said first named coupling member and provided with a bayonet slot for receiving said pin, the transverse portion of said slot being inclined from the longitudinal portion thereof toward the outer end of the coupling member, the bore of said coupling member being enlarged to provide a shoulder, a perforated sealing disk slidably mounted in the enlarged portion of said bore, and a spring confined between the ends of said conduit and said disk for urging said disk against said first named coupling member.

2. The combination with a hollow coupling member having a pin projecting from one side thereof and a spring-pressed closure, of a pump, a discharge conduit having one end secured to the outlet of said pump, a second hollow coupling member for receiving the closed end of said first named coupling member secured to the other end of said conduit and provided with a bayonet slot adapted to co-act with said pin, a perforated sealing disk mounted to reciprocate in the bore of said coupling member, means for yieldingly urging said sealing disk against the closed end of said first named coupling member, and means for limiting the movement of said sealing disk in the direction of said second coupling member.

3. The combination with a hollow coupling member having a spring-pressed closure, of a pump, a discharge conduit having one end secured to the outlet of said pump, a second hollow coupling member for receiving the closed end of said first named coupling member secured to the other end of said conduit, a perforated sealing disk mounted to reciprocate in the bore of said coupling member, means for yieldingly urging said sealing disk against the closed end of said first named coupling member, and means for limiting the movement of said sealing disk toward said second coupling member.

4. The combination with a hollow coupling member having a spring-pressed closure, of a pump, a discharge conduit having one end secured to the outlet of said pump, a second hollow coupling member for receiving the closed end of said first named coupling member secured to the other end of said conduit, a perforated sealing disk mounted to reciprocate in the bore of said coupling member, and means for yieldingly urging said sealing disk against the closed end of said first named coupling member.

5. The combination with a pump having a flexible conduit connected with the outlet thereof, of a hollow coupling member secured to the other end of said conduit and provided with a bayonet slot, the transverse portion of said slot being inclined from the longitudinal portion thereof toward the outer end of the coupling member, the bore of said coupling member being enlarged to provide a shoulder, a perforated sealing disk slidably mounted in the enlarged portion of said bore, and a spring confined between the ends of said conduit and said disk for urging said disk toward said shoulder.

6. The combination with a pump having a discharge outlet, of a coupling member connected with said discharge outlet and provided with a bayonet slot, the transverse

portion of said slot being inclined from the inner end of the longitudinal portion thereof toward the outer end of said coupling member, a perforated sealing disk slidably mounted in the bore of said coupling member, and means for yieldingly urging said sealing disk toward the outer end of said coupling member, and means for limiting the movement of said sealing disk toward the outer end.

7. The combination with means for supplying lubricant under pressure, said means comprising a discharge outlet, of a coupling member connected with said discharge outlet, a perforated cup leather slidably mounted in said coupling member, and means for yieldingly urging said cup leather toward the outer end of said coupling member.

8. The combination with an apparatus having a part to be lubricated, of a conduit for conducting lubricant to said part, a coupling member secured to the end of said conduit and provided with a spring-pressed valve closure, means for supplying lubricant to said conduit comprising a receptacle provided with a discharge outlet, a second coupling member connected with said discharge outlet, means for detachably uniting said coupling members, and means for sealing the joint between said coupling member and for removing excess lubricant from the adjacent ends thereof when said coupling members are uncoupled.

9. The combination with an apparatus having a part to be lubricated, of a conduit for conducting lubricant to said part, a coupling member secured to the end of said conduit and provided with means for supplying lubricant to said conduit comprising a receptacle provided with a discharge outlet, a second coupling member connected with said discharge outlet, means for detachably uniting said coupling members, and a pliable gasket for sealing the joint between said coupling members.

10. The combination with an apparatus having a part to be lubricated, of a conduit for conducting lubricant to said part, a coupling member secured to the end of said conduit and provided with means for supplying lubricant to said conduit comprising a receptacle provided with a discharge outlet, a second coupling member connected with said discharge outlet, and means for detachably uniting said coupling members and for removing excess lubricant from the adjacent ends thereof when said coupling members are uncoupled.

11. The combination with a bearing provided with a member for receiving lubricant, of means for supplying lubricant thereto comprising a hollow member, means for supplying lubricant to said hollow member under pressure, means for detachably connecting said members, and means for sealing said connection comprising a gasket positioned between said members and held against one of said members by the pressure of the lubricant.

12. The combination with a bearing provided with a member for receiving lubricant, of means for supplying lubricant thereto comprising a hollow member, means for supplying lubricant to said hollow member under pressure, means for detachably connecting said members, means for sealing said connection, comprising a gasket positioned between said members and held against one of said members by the pressure of the lubricant, and a spring for initially positioning said gasket against said member.

13. The combination with a receptacle for receiving lubricant, of means for supplying lubricant to said receptacle comprising a hollow member, means for forcing lubricant into said hollow member under pressure, and means for connecting said hollow member to said receptacle in fluid-tight relation comprising a pliable member positioned in said hollow member and having one face for contacting with said receptacle, the other face of said pliable member being subjected to the pressure of the lubricant in said hollow member.

14. The combination with a grease cup comprising a tubular member having one end flanged inwardly to provide a closure seat, a closure, a pin extending through said tubular member and from both sides thereof, and a spring confined between said pin and closure, and tending to hold said closure on its seat, of a grease pump having a discharge conduit, and means co-acting with the ends of said pin for detachably connecting the discharge end of said conduit with said grease pump.

15. The combination with a grease cup comprising a tubular member having a closure seat, a closure, a pin extending through said tubular member and from both sides thereof, and a spring confined between said pin and closure, and tending to hold said closure on its seat, of a grease pump having a discharge conduit, and means co-acting with the ends of said pin for detachably connecting the discharge end of said conduit with said grease cup.

16. The combination with a grease gun having a discharge conduit, of means for connecting said conduit with a bearing comprising a tubular member, co-acting means on said conduit and said tubular member for detachably connecting said conduit and tubular members, and a flexible member for sealing the joint between said conduit and said tubular member, said flexible member having an aperture for the passage of lu-

bricant from said conduit to said tubular member, a portion of one face of said flexible member being positioned so as to be subjected to any pressure created in said conduit to force it against said tubular member.

17. The combination with means for supplying lubricant under pressure comprising a discharge member, of means for connecting said discharge member to a bearing comprising a tubular member, and means for detachably connecting said members in sealed relation comprising means subjected to the pressure created in said members, the said means being positioned between said members and held against one of said members by said pressure.

18. The combination with a member for receiving lubricant, of means for supplying lubricant thereto under pressure comprising a tubular member, means for detachably connecting said tubular member to said lubricant-receiving member in sealed relation comprising a flexible member provided with an aperture for the passage of lubricant, one face of said member being subjected to the pressure of the lubricant.

In witness whereof, I hereunto subscribe my name this 14th day of December, 1918.

ARTHUR V. GULLBORG.

Witnesses:
JOHN E. CARLSON,
JOHN L. STEFFEN.

DISCLAIMER.

1,307,734.—*Arthur V. Gullborg*, Chicago, Ill. LUBRICATING MEANS. Patent dated June 24, 1919. Disclaimer filed August 29, 1927, by the assignee by mesne assignments, *The Bassick Manufacturing Company*.

Hereby enters this disclaimer to that part of the claims in said specification which is in the following words, to wit:

"12. The combination with a bearing provided with a member for receiving lubricant, of means for supplying lubricant thereto comprising a hollow member, means for supplying lubricant to said hollow member under pressure, means for detachably connecting said members, means for sealing said connection comprising a gasket positioned between said members and held against one of said members by the pressure of the lubricant, and a spring for initially positioning said gasket against said member."

[*Official Gazette September 13, 1927.*]

542

C. SENG.

PIPE COUPLING

APPLICATION FILED DEC. 23, 1915.

1,322,357.

Patented Nov. 18, 1919.

Fig. 1.

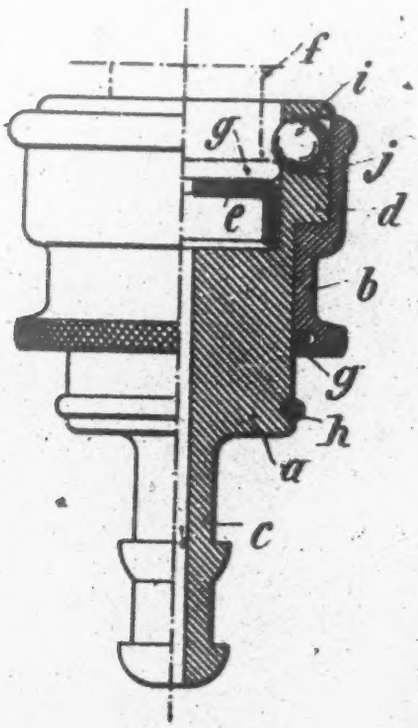


Fig. 4.

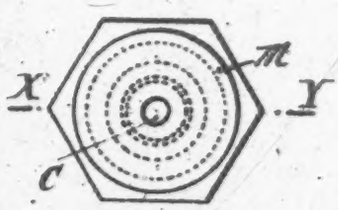


Fig. 3.

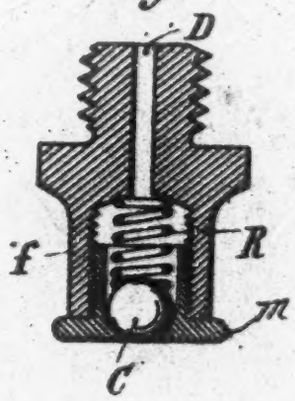
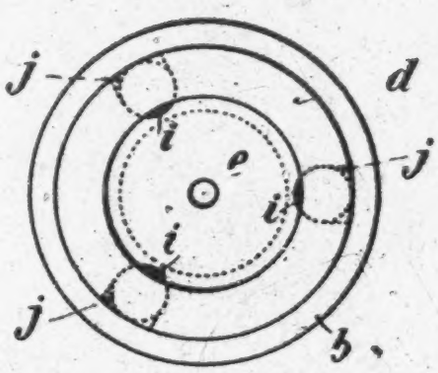


Fig. 2.



Inventor:
Camille Seng,
by Hazeltine, Lake & Co.
atty.

UNITED STATES PATENT OFFICE.

CAMILLE SENG, OF ROMILLY-SUR-SEINE, FRANCE.

PIPE-COUPLING.

REISSUED

1,322,357. Specification of Letters Patent. Patented Nov. 18, 1919.

Application filed December 26, 1915. Serial No. 68,421.

To all whom it may concern:

Be it known that I, CAMILLE SENG, a citizen of the French Republic, and a resident of Romilly-sur-Seine, Department of the Aube, in the Republic of France, have invented certain new and useful Improvements in Pipe-Couplings, of which the following is a specification, reference being had therein to the accompanying drawing.

The present invention relates to an instantaneous joint for fluids under pressure, characterized essentially by the fact that both parts of the joint are connected or separated from each other by the longitudinal displacement, upon one of the said parts, of a controlling sleeve intended to operate balls: these means being adapted to engage or not with the other part of the joint which, to this end, is provided with a connecting flange or the like means. The joint may, more particularly, be constituted by a body comprising a chamber within which the other part of the joint may be introduced, which rests or bears on a resilient packing insuring fluid-tightness of the joint. The connection is effected by means of balls which project into the said chamber and are located in recesses formed in the joint; the said balls actuated in opposition to their active connecting parts by means of the controlling sleeve without the assistance of intermediate members.

This instantaneous joint is more particularly applied in the case where it is desired to have forced lubrication with oil, grease and so on. In this case the joint which is connected to the piping of the delivery mechanism of a pump or the like, may be secured as desired by the operation of the sleeve actuating the balls upon the connecting flange with which the lubricator must be provided for that purpose. This flange may be formed upon the cap which closes the lubricator and which comprises an opening constituting a seat for the obturator subjected to the action of an internal spring.

The accompanying drawings illustrate, by way of example, a constructional form of the invention.

Figure 1 shows partly in elevation and partly in vertical section, a constructional form of the instantaneous joint forming the subject matter of the invention.

Fig. 2 is a corresponding sectional plan.

Figs. 3 and 4 show in vertical section taken on line X Y and in plan, respectively, a constructional form of ball lubricator which has been more particularly designed for use in conjunction with the instantaneous joint in the case of forced lubrication.

This new joint consists of a tubular body *a*, and an operating or controlling sleeve *b* adapted to slide on the said body *a*.

At one of its ends, the body *a* is constructed so as to form a pipe *c* intended to receive the pipe connecting the joint with the supply apparatus, such as lubricator, pump of other apparatus. At its opposite end, the body *a* forms a hollow head *d* having seated therein a fluid-tight washer *e* constituted by a piece of cupped leather, against which bears the end of the pipe *f* of the working apparatus to be connected. This pipe *f* comprises at its end a small flange *g* adapted to engage with a certain number of balls *i* (three in the illustrated example), arranged at equal distances from one another in radial recesses *j* formed in the head *d*.

The thickness of the annular portion of the head *d* and the diameter of the balls *i* are designed in such a manner that the said balls project into the interior of the recess formed in the head *d* when, the sleeve *b* being operated, these balls bear against the inner wall of the said sleeve.

A split ring *h* located in a groove formed in the body *a* projects around the latter in order to limit the travel of the sleeve *b*. This travel is designed in such a manner that when the sleeve *b* is drawn to the rear it permits of the disengagement of the balls *i* but sufficiently covers the recesses *j* to prevent the said balls from dropping out.

Under these conditions, in order to connect the tubular body *a* with the pipe *f* it is sufficient, after having previously displaced the sleeve *b* to the rear, to introduce the said pipe *f* into the head *d* so that the small flange *g* will bear against the washer *e*, between the latter and the balls *i*. As soon as the parts are in such contact, the sleeve *b* is pushed. This movement has for its effect to cause the balls *i* to converge toward the axis of the joint so that they will slide against the rear portion of the flange and cause the same to bear with pressure against the fluid-tight washer *e*.

In order to disengage the joint it is sufficient to draw the sleeve *b* to the rear.

In this new joint, the engaging and disengaging operations may be performed very

easily by means of one hand only, the only movement to be effected consisting in sliding in a straight line the sleeves *b* on the body *a*, which movement takes place by itself under the effect of the introduction or withdrawal of the joint.

This instantaneous joint which may be used for insuring the junction of the two conduits wherein any fluid circulates and in particular, wherein any fluid under pressure circulates, may be used particularly in the case of forced lubrication with oil or grease. To this end recourse may be had to a ball lubricator forming an obturator and comprising an external flange for securing and fixing the joint.

Referring to Figs. 3 and 4, this lubricator is constituted by a hollow body *f* formed with a conduit D for the lubricant. A screw-threaded extension permits of placing the lubricator in place. In the chamber within the body *f* which is formed with a screw-thread, a plug *m* is screwed, provided with the flange against which the balls *i* are designed to engage, so as to effect a joint with the pump intended to deliver the lubricant. In the illustrated example, the plug *m*, is, moreover, hollowed out internally so as to receive a ball C constantly pushed against its seat by an inner spring R thus insuring closure of the lubricator.

It should be noted that the pressure of the fluid exerts itself within the chamber formed by the piece of cupped leather *e* in the direction of application of the same against the end of the pipe *f*.

What I claim and desire to secure by Letters Patent of the United States is:

A coupling comprising a tubular member provided at one end with an external annular shoulder, said shoulder having substantially radial seats therein which are open at their inner and outer ends and communicate with the interior of the coupling, a ball in each of the seats, the outer end of each socket being open for the introduction and removal of the ball and the inner end of the seats being restricted to permit of the ball extending a limited distance into the interior of the coupling, said coupling being provided with an internal shoulder inward of the seats, a slidable sleeve embracing the tubular member and normally closing the outer ends of the seats, said sleeve having an internal shoulder for engagement with the inner end of the annular shoulder on the coupling member to limit movement of the sleeve in one direction, and a ring sprung into an external groove on the coupling member in position to limit movement of the sleeve in the opposite direction.

In testimony whereof CAMILLE SENG has affixed his signature.

CAMILLE SENG.

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Dec. 4, 1923. 1,475,980

O. ZERK

LUBRICATING APPARATUS

Original Filed Nov. 21, 1922 2 Sheets-Sheet 1

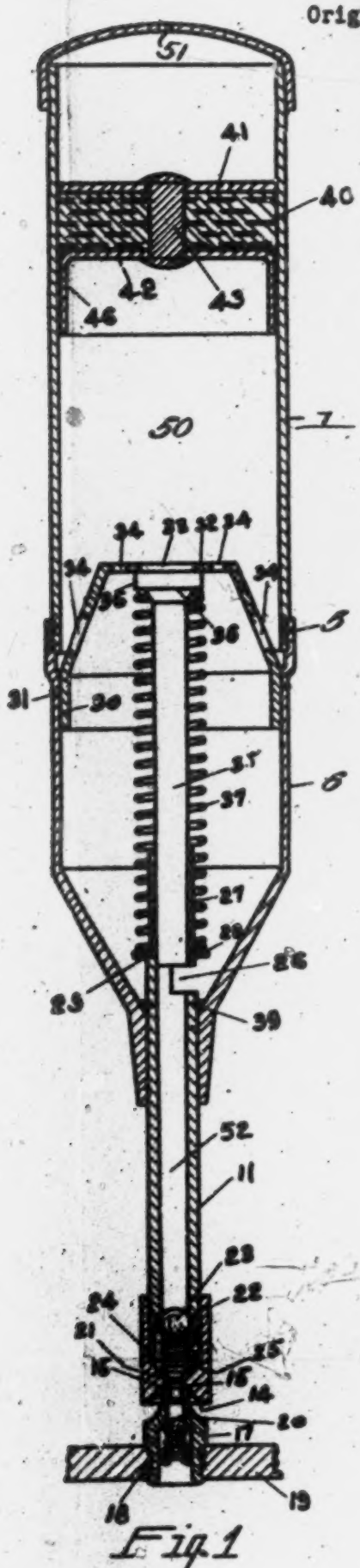

Fig. 1

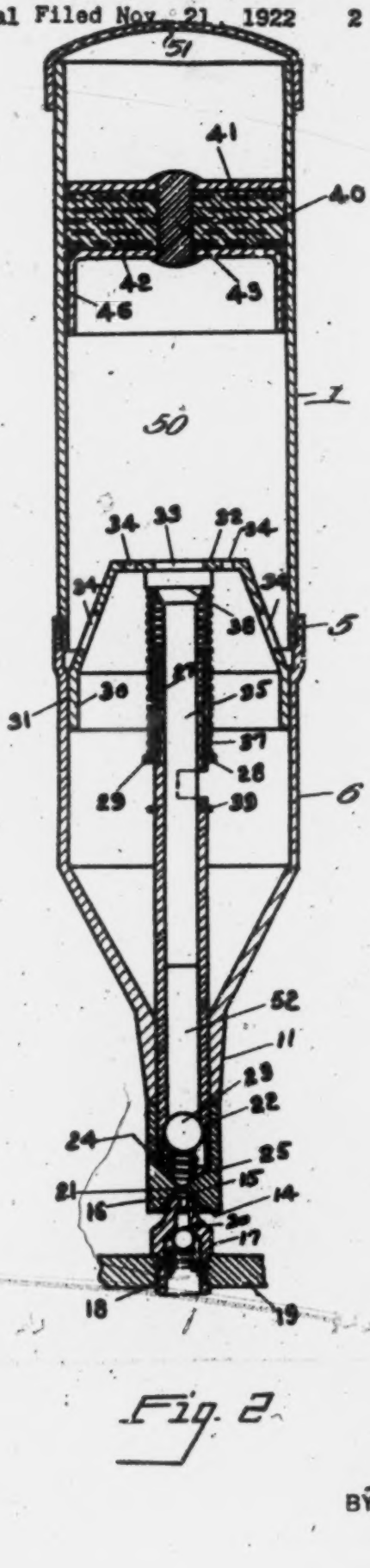

Fig. 2

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548

Dec. 4, 1923. 1,475,980

O. ZERK

LUBRICATING APPARATUS

Original Filed Nov. 21, 1922 2 Sheets-Sheet 2

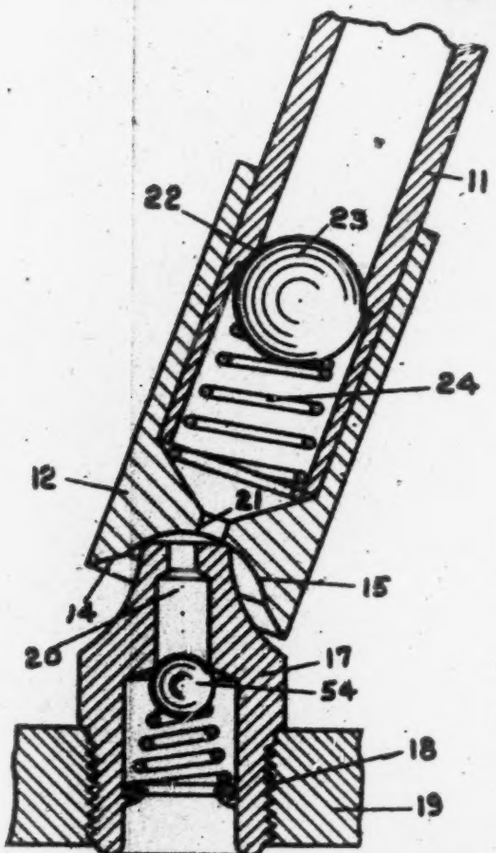

Fig. 3

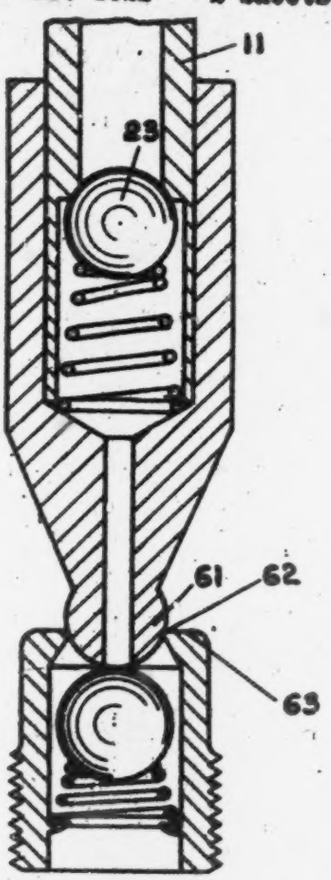

Fig 4

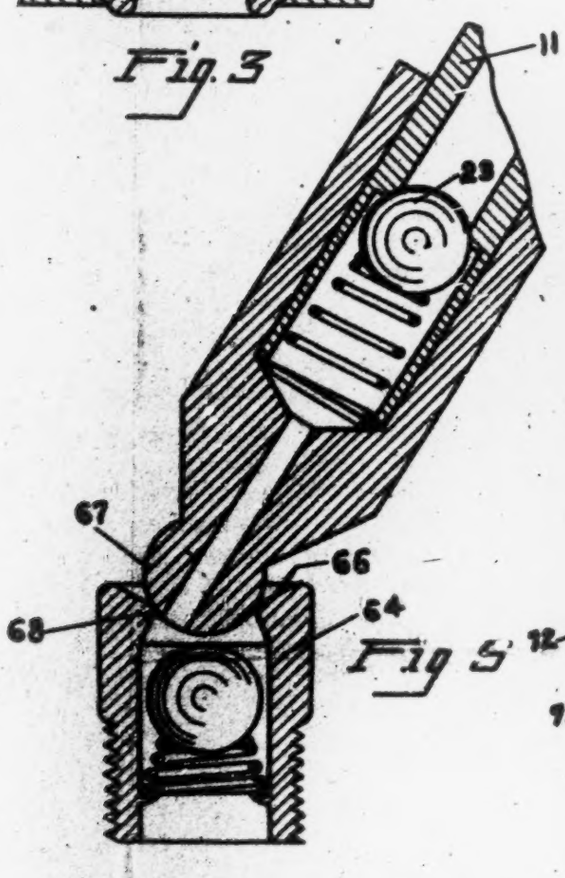

Fig 5

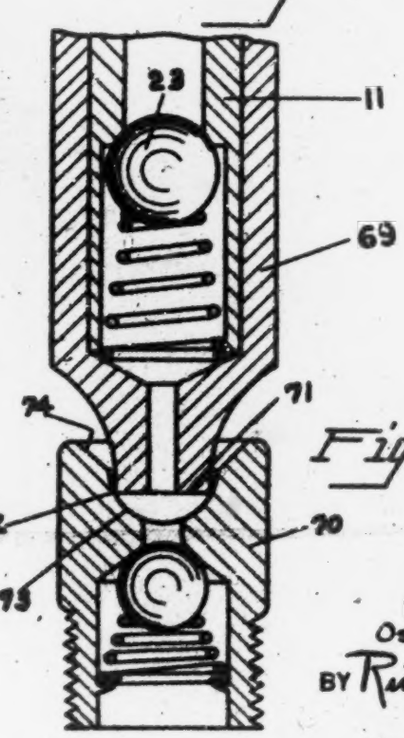

Fig 6

INVENTOR
OSCAR ZERK
BY Richey Sloman & Watts
HIS ATTORNEYS

Patented Dec. 4, 1923. 1,475,980

UNITED STATES PATENT OFFICE.

OSCAR ZERK, OF CLEVELAND, OHIO, ASSIGNOR TO THE ALLYNE-ZERK COMPANY, OF CLEVELAND, OHIO.

LUBRICATING APPARATUS.

Original application filed November 21, 1922, Serial No. 602,465. Divided and this application filed August 2, 1923. Serial No. 655,294.

To all whom it may concern:

Be it known that I, OSCAR ZERK, a citizen of Republic of Czechoslovakia, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Lubricating Apparatus, of which the following is a specification.

My invention relates to improvements in lubricating apparatus.

In the lubrication of moving elements, and especially in automobiles, it has become uniform practice to provide the elements with inlet nipples, to which a grease or oil gun is detachably secured. Generally, the gun is provided with a flexible outlet tube having at its end a coupling which is adjusted manually and locked against the inlet nipple to provide a tight joint therebetween. After the user has locked the coupling by hand, he then grasps the gun barrel with one hand and with the other hand screws the plunger down, forcing the grease through the conduit.

These several operations each require considerable time, are often performed from awkward positions, and further, in handling the coupling, from which grease leaks during the pressure operation and especially after being removed, the user's hands become greasy and dirty causing the gun and the coupling to slip when handled, and necessitating additional time in which to perform the attaching and detaching operations.

The main object of my invention resides in overcoming these objections by so constructing a pistol and a nipple, that the pistol can be held in one hand and placed in direct osculatory, leak proof contact with the nipple, and while so held will inject lubricant into the nipple, when direct pressure is applied thereto.

Another object of my invention resides in providing a pistol with a metal connector which is so shaped that it forms a leak proof direct metal to metal contact with a nipple.

Another object of my invention resides in constructing the contact portions of the nipple and the connector, so that a leak proof, direct pressure contact can be manually maintained between a surface of the one and an edge of the other.

Another object of my invention is to construct the contacting portions of a nipple and a connector, so that one provides a peripheral circular edge which fits against a spherical surface of the other, to provide a leak proof pressure maintained contact therebetween, which when pressed together in varying angular relations the circular edge remains covered by the dome-shaped portion of the spherically shaped surface within such circular edge.

Another object of my invention resides in the construction of a lubricant dispensing pistol consisting of a barrel having pressure creating means associated therewith, a lubricant exit and a handle portion whereby the user can grasp the pistol by its handle portion with one hand and by direct pressure, form a leak proof connection between the exit and a nipple inlet opening, to allow the lubricant to pass under pressure and without loss from the pistol into the nipple.

Another object of my invention is to provide an improved lubricating system comprising a gun with a lubricant reservoir and a nozzle, the said nozzle having a contact face with a centrally disposed exit opening together with a lubricant receiving nipple with a face having an inlet opening positioned preferably centrally thereof, the one face having a peripheral circular edge and the other face having a spherically shaped surface, and means adapted to eject lubricant under pressure from the said exit opening, the said nozzle contact face being adapted to be pressed against that of the nipple by the operator pressing the gun toward the nipple from any one of a number of different angular directions, the manual pressure so exerted being adapted to cause the ejection of lubricant from the nozzle into the nipple and at the same time to provide sufficient pressure to maintain a tight lubricant proof contact between the circular edge of the one contact face with the spherical surface of the other contact face which engages it.

The invention further resides and consists in the arrangement and combinations of parts hereinafter described and claimed, reference being had to the accompanying drawings wherein—

Fig. 1 is a medial vertical longitudinal sectional view of an embodiment of my invention.

Fig. 2 is a similar longitudinal section of

the same in osculatory manual pressure maintained contact with an improved nipple adapted to cooperate therewith, each of the parts being shown in lubricant discharging position.

Fig. 3 shows an enlarged view of the nozzle and nipple illustrated in Figs. 1 and 2, but the nozzle being presented angularly to the nipple.

Fig. 4 shows another embodiment of my invention comprising a nozzle terminating in a ball having a forward spherical end face together with a nipple adapted to co-operate therewith.

Fig. 5 shows another embodiment of my invention comprising the same kind of nozzle end together with a nipple contact face with a surrounding guide portion, the nozzle being present angularly to the nipple.

Fig. 6 shows another embodiment of my invention wherein the contact faces of the nozzle and nipple as shown in Figs. 1 to 3 inclusive are reversely formed, that of the nipple in this embodiment being similar to that of the nozzle in the first embodiment, and vice versa.

Referring now to all of the drawings, in all of which like parts are indicated by like reference characters;

At 1 I show a cylindrical lubricant containing reservoir, or barrel, having a cover 2 at its rear or breech end. The barrel has its forward or muzzle end threaded externally as shown at 5, and over which threads a head 6 is adapted to be screw-threaded so as to rigidly secure the head 6 to the barrel 1. The head 6 comprises preferably a cylindrical portion 7 and a tapered end 8, together with a bearing portion 9, the bearing portion 9 being of reduced diameter and containing a cylindrical bore 10, which is disposed in axial alignment, preferably, with the reservoir barrel 1.

Within the bore 10 a cylindrical tube 11 is adapted to telescope the external cylindrical walls of the tube making a close fit with the internal cylindrical walls of the bore 10. At the end of the tube 11 a nozzle 12 is rigidly affixed, as by driving the nozzle 12 onto the end of the tube 11, the end of the tube making a tight driving fit within the cylindrical walls 13 of the nozzle.

Now referring first to the particular embodiment of my invention illustrated in Figs. 1, 2 and 3, the nozzle is recessed at its front and rear portions, the rear recess containing the cylindrical walls 13 and the forward recess containing the outer flared guiding walls 14 and a spherical contact face 15.

The spherical contact face 15 is adapted to be engaged by the circular rim 16 of a bearing receiving nipple 17, screw-threaded by its stem 18 into the frame 19 adjacent a machine bearing, the nipple containing a passageway 20 leading from the bearing surfaces to the center of the contact face within the rim 16, and communicating with the nozzle orifice 21 of the gun. The tube 11 has its forward end, fitting within the cylindrical nozzle walls 13, of increased internal diameter, so as to provide a valve seat 22 for a check valve ball 23, spring pressed against such seat by a spiral spring 24, bearing against the valve ball, and seating against the end wall 25 of the nozzle recess.

The tube 11 projects within the head 6 and contains therein a port 26 and a plunger guide portion 27, the said plunger guide portion extending beyond the port 26 toward the interior of the gun. The guide portion 27 carries a washer 28 seated against a shoulder 29 which results from the making of the end of the guide portion 27 of slightly reduced external diameter. A metallic bridge 30 is rigidly secured to the head 6 as by making it a tight driving fit within the portion 31 of the head, or by electrically welding it to such portion, or in any other well known suitable way, and is preferably substantially cup shaped, its bottom wall 32 being perforated at 33 and elsewhere, as shown variously at 34.

At 35 I show a piston plunger comprising a relatively long cylindrical rod and a rear enlarged head or flanged portion 36, the end of the head 36 being adapted to seat on the bottom wall 32 of the bridge 30, the head 36 being of larger diameter than the diameter of the opening 33 through such bottom wall.

A spiral compression spring 37 is disposed between the inner face 38 of the flanged end 36 of the plunger 35 and the washer 29, which is carried upon the guide portion 27 of the telescoping tube 11, the spring 37 serves to exert a separating pressure on the plunger and the tube, so as to tend to keep them in extended positions, as shown in Fig. 1, and to retract them to such positions after a discharging operation, wherein the plunger and the tube have been telescoped to the positions shown in Fig. 2, as will be later described. The tube 11 is maintained in the position shown in Fig. 1 by the pressure of the spring 37, by virtue of a washer 39, which is sprung into place on the tube 11, being tightly fitted thereto, the tube 11 being slightly ferruled so as to receive such washer, the outer forward edges of the washer contacting with the innermost forward portion of the conical internal wall of the head portion 8.

Within the gun barrel 1, I provide a piston or movable reservoir wall, said piston or movable wall comprising, preferably, an intermediate cork piston 40, and clamping end washers 41 and 42. At 43 I show a clamping rivet, the intermediate portion being of slightly reduced diameter and passing through cylindrical aligned

openings in the cork piston 40 and washers 41 and 42, said openings being preferably axial relative to the bore of the barrel 1, within which bore the piston is adapted to be reciprocated.

The washer 42 is preferably cup-shaped, having cylindrical side walls 46 adapted to loosely fit within the inner walls of the barrel 1 and serving to guide the piston through the bore of the barrel, and to limit any tendency toward tilting, or so-called kipping, of the piston, which, if present, would reduce the freedom of movement otherwise had by the piston within the barrel.

The piston thus described is reciprocable within the barrel 1, but I do not provide any direct means of reciprocating such piston, such as a handle adapted to manually operate the piston, or a spring to propel such piston, nor do I provide means for supplying a positive fluid pressure from a pump or equivalent mechanism, relying, as will be later described, upon the effect of a vacuum, so-called.

Having now described the different parts of the specific embodiment of my invention herein illustrated, I will now describe the operation of the gun when used to dispense a lubricant, such as grease, through a bearing nipple, such as the nipple 17.

Prior to the use of the gun the reservoir chamber 50 is filled with lubricant by dissociating the barrel 1 from the head 6 by unscrewing the head and barrel from one another, the parts being separated at the threads 5, normally joining such parts, for the purpose of loading the barrel. In loading the barrel all of the space comprising the chamber 50 is filled with lubricant, and the piston or movable wall is forced to its rearmost position, wherein the piston end wall or washer 41 comes into contact with the cover 2, the air within the barrel to the rear of the piston being forced out through the orifice 51.

Also, at the same time it is understood that the other interior chambers of the gun, such as the chamber within the head 6 and the bridge 30, and the chamber within the tube 11, have been previously filled with grease or oil. This is preferably done by the manufacturer of the gun, before the gun is put into the hands of a user, this being accomplished by the manufacturer in any suitable way, as by applying grease or oil under pressure to barrel to the rear end of the head 6, and forcing it through the chamber contained within the head, through the orifices 34 and through the port 26, until the chamber within the tube 11 is also filled, and the lubricant begins to come through the orifice 21 of the nozzle 12. This is not a necessary prerequisite, but is preferred as permitting the instantaneous ready use of the lubricating gun of my invention without any preliminary non-lubricant discharging operations by the user.

The barrel 1 and the head 6 being thus charged with grease and re-united by the screw threads 5, the operator grasping the gun by the handle 3 will place the spherical contact face 15 of the nozzle in contact with the rim 16 of the nipple 17, the reduced end of the nipple being guided into engagement with such contact face by the flared guide surfaces 14 extending outwardly from the spherical contact face. The operator will then press on the handle forwardly towards the nipple, causing the head 6 to telescope over the tube 11, and at the same time causing the cylindrical plunger 35 to be pressed forwardly within the guide 27 of the tube 11 by the engagement of the bottom wall 32 of the bridge 30 with the rear enlarged face of such plunger. The plunger will, therefore, be advanced forwardly past the port 26 of the tube 11, closing such port and trapping lubricant contained within the tube 11 and, the operation being continued, the plunger 35 forced within the chamber 52 of the tube 11, will displace the lubricant contained within such chamber, forcibly ejecting it under great pressure past the ball valve 23—22, and through the nozzle orifice 21, such discharged lubricant entering the passage 20 of the nipple and past the ball valve 54 of the nipple to the bearing surfaces to be lubricated. A leak proof connection is maintained between the rim or edge 16 of the nipple contact face and the spherical contact face of the nozzle by the manual pressure exerted toward the nipple upon the handle. This is true, even though the angle from which the nozzle is presented to the nipple is varied widely, the nipple circular edge making a tight joint with the nozzle spherical face 15 in all cases, so long as they are pressed together, and when so pressed together complete a closed conduit or passage-way for lubricant under high pressure passing from the gun nozzle to the interior of the nipple. Although I have described my invention in connection with a gun wherein the nozzle is rigidly secured to the reservoir, I may sometimes employ the means of my invention, broadly considered, in a form of gun wherein the nozzle is placed at the end of a flexible tube leading to the gun reservoir.

The very desirable result of securing a manually maintained lubricant leak-proof connection between the nozzle and the nipple even when the gun is pressed from different angular directions toward the nipple, is very valuable as when the gun is used to lubricate nipples such as those herein illustrated placed adjacent the surfaces of machine bearings on an automobile where the space is oftentimes limited in which the gun can be operated, and intervening portions

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of the automobile prevent direct axial alignment of the gun and nipple, or, at any rate, make it awkward to so position the gun relative to the nipple. In my present invention I secure this result and at the same time utilize the connection creating pressure to force lubricant from the gun through the leak-proof joint thus secured by pressure and I secure the ejection of the lubricant under a very high pressure at the same time, and with the same manual effort as the tight leak-proof connection is secured. I thus have provided a one-hand lubricant gun capable of being used for oil or grease or other lubricant, or for any liquid or fluid substance sought to be ejected from a reservoir to a receptacle which may comprise an inlet nipple.

Referring now particularly to Fig. 3 of the drawings, in this figure the nozzle is shown as being presented at an angle to the axis of the nipple and a leak-proof connection is shown as being secured between the peripheral edge of the contact face of the nipple and the spherical concave face of the nozzle, to form a closed leak-proof passageway between the end closed nozzle orifice and the nipple orifice. By comparing the relation of the parts as indicated in Fig. 3, with the same parts as shown in Figs. 1 and 2, it will be seen that the same kind of a connection is secured and the lubricant may be ejected from the nozzle to the nipple in the same way by manual pressure exerted against the gun towards the nipple.

In Fig. 4 I show a modified form of nozzle end and nipple wherein the nozzle instead of having a concave contact face, spherically formed, terminates in a ball 61, having its forward portion convex spherically formed, the convexly rounded end of the nozzle fitting within the circular inner rim 62 of a nipple annular contact face 63, and making a leak-proof connection between the circular rim of the nipple contact face, and the convexly rounded contact face of the nozzle.

Fig. 5 shows another view of a similar nozzle and nipple to that illustrated in Fig. 4 modified, however, in that the nipple 64 is shown as comprising an outwardly flaring guide portion 66 like, in this respect, to the nozzles of Figs. 1 to 3 inclusive, and like them serving to guide the face 67 of the nozzle to the apertured contact edge 68 of the nipple. Also in this figure, the nozzle is presented against the nipple from a different angular direction than in axial alignment therewith, but serving to maintain, just as when in axial alignment, a tight lubricant proof connection between the nozzle and the nipple when pressure is directed by the user to force the gun against the nozzle.

In Fig. 6 I show another embodiment of my invention wherein the nozzle and nipple contact faces are reversely formed from those shown in Figs. 1 to 3 inclusive, the nozzle 69 having a flat contact face 71 with a circular knife edge rim and the nipple 70 having a concave face 73 spherically formed and adapted to receive the nozzle end, and the parts being guided to lubricant dispensing leak proof connecting position by an outwardly flared guiding surface 74 surrounding the concave contact face of the nipple.

Having described my invention in connection with a particular kind of lubricant dispensing gun, I am aware that my improved nozzle and nipple connection may be embodied in structures varying widely from that herein illustrated and described, and when used in connection with a gun such as a lubricant gun, the construction of the gun may likewise be varied. In my co-pending application Serial No. 602,465, filed November 21, 1922, likewise I show a different form of gun and a number of different kinds of nozzles and nipples embodying the principles of my invention, and in my co-pending application Serial No. 602,466 filed November 21, 1922, I show still another form of gun together with a nozzle and nipple used in connection therewith employing the principles of my invention. I elect to claim in this application my invention comprising a nozzle and a nipple and the parts associated therewith broadly, and to claim herein more specifically that construction of nozzle and nipple wherein the nozzle has a concave contact face adapted to receive the nipple end, and to claim in other co-pending applications other forms of apparatus embodying the broad principles of my iavention herein disclosed.

After a charge of lubricant of a volume at least equal to the volume of space occupied by the plunger piston 35, disposed forwardly of the port 26, has been discharged from the gun, the operator will release the forwardly direct pressure on the handle and the spring 37, which, during such operation, was pressed as shown in Fig. 2, will cause the piston and nozzle to regain their normal extended positions, as shown in Fig. 1, the spring 37 being strong enough to accomplish this over the power of a so-called vacuum created in the chamber 52 when the plunger 35 is removed therefrom, and the ball valve 22 and 23 during such removal being tightly closed.

At the moment the port 26 is again uncovered by the retractile action of the spring 37 upon the piston 35 the power of this vacuum will be communicated to the grease within the head 6, and which body of lubricant is continuous through the openings 34 of the bridge 30 through the chamber 50 of the barrel 1 to the piston comprising

the parts 40, 41 and 42, and the entire body of lubricant will be drawn forwardly, together with the large piston follower or so-called movable wall 40—41—42, and the tube 11 will be immediately recharged with lubricant.

Although I have described the foregoing operation whereby the lubricant together with the follower or movable wall is drawn forwardly in the barrel 1 after a discharging operation, by referring to the so-called vacuum as drawing the lubricant and piston forward so that a new charge of lubricant is drawn into the chamber 52 for a subsequent discharging operation of the gun as described, I believe that another way of describing the operation relative to the recharging of the chamber 52 would be to state that lubricant together with the piston follower or movable wall is pressed forward by atmospheric pressure acting on its rear side, as through the opening 51, this atmospheric pressure being in excess of the hydraulic pressure existing on the forward portion of the lubricant when the piston 35 has been withdrawn from the chamber 52, such withdrawal causing a consequent reduction in hydraulic pressure on the forward side of the said lubricant.

But in any event I find that the said follower always is in contact with the body of lubricant ahead of it, and the lubricant is forced forwardly into the chamber 52 after every discharge operation, as described.

By referring now to the different embodiments of my invention illustrated, it will be observed that the lubricant conducting connection between the lubricant gun nozzle and the element to be lubricated comprises a contact face for the nozzle and a contact face for the element, the two contact faces being adapted to be pressed together such as by manual pressure directed from the gun toward the element, one of the said contact-faces having a spherical surface, and the other contact face comprising an edge which is circular and is preferably very narrow, to form a very thin annular surface against which the spherical surface is pressed. In the different figures of drawing I have shown this very narrow annular surface as being formed on substantially the same radius of curvature as that of the said spherical surface, but the area of the annular contact surface in all cases where the annular surface or so-called edge, is placed on the nozzle or on the element to be lubricated, is of reduced area so as to intensify the lubricant sealing pressure exerted against such reduced surface.

I wish it to be understood also that where I have used the term "annular" in the claims and accompanying this specification and forming a part hereof, that I used it in the sense of its being circular or substantially so, or so as to accomplish the same results as a circular face edge, in substantially the same way.

I find that by so forming the contacting portions of the nozzle and the element to be lubricated, that a great sealing pressure can be exerted between the contacting portions of the nozzle and the element in excess of the hydraulic pressure exerted by the lubricant enclosed by such portions so as to effectually retain the lubricant in the passageway thus formed, and I find that this can be most effectually accomplished by the novel means I have herein provided, and which comprise generally the contacting faces I have herein described.

My invention contemplates, moreover, the provision of contact faces for a lubricant gun nozzle, and a lubricant receiving element which have their engaging portions formed of hard material such as metal, and I prefer to use steel for the material having such surfaces, as by the use of such hard material, I secure a permanence of the contact surfaces which cannot otherwise be secured due to the durability of the material and I secure an increased degree of efficiency since the contacting portions are unyielding as would be the case were they formed of rubber or like material.

By the construction of a temporary joint between the gun nozzle and lubricant receptacle, as has been described, the end of the nozzle is adapted to be fitted to the contact face of the receptacle and to make a pressure maintained, substantially line contact therewith without forcing dirt which may accumulate on the exterior of the receptacle, into the interior passages thereof and making a lubricant proof joint, the preferable metal-to-metal contact substantially on a circular line causing a cutting through of the accumulated dirt.

Also especially in those forms of my invention having a very small inlet opening leading into the interior of the receptacle the liability of any considerable amount of dirt being forced into the receptacle is minimized. By providing such a metal-to-metal joint between the nozzle and the nipple, such dirt will be excluded from the joint which is not the case where a pressure joint is established between contacting portions of rubber or other gasket material.

This case is a division as to the subject matter claimed herein, of an earlier application, Serial Number 602,465, filed November 21, 1922.

Having thus described my invention in a number of embodiments, I am aware that numerous and extensive departures may be made from the embodiments herein illus-

trated, described and referred to, but without departing from the spirit of my invention.

I claim:—

1. In a lubricating apparatus, the combination with a lubricant receptacle element of a lubricant reservoir for supplying lubricant thereto, means to put the lubricant in the reservoir under pressure, a lubricant feeding nozzle element, said reservoir communicating lubricant under pressure thereto, said receptacle element and said nozzle element having cooperative substantially non-compressible contact faces and openings therethrough, one of said contact faces having a concavely spherical surface, the other contact face having a dirt cutting circumferential edge portion adapted to be embraced within the spherical surface of the other face and providing a solid contact therewith when the nozzle is pressed against the receptacle element from any one of a plurality of angularly different directions, to make a sealed, substantially non-yielding, lubricant conducting, connection between the face openings.

2. In a lubricating apparatus, the combination with a lubricant receptacle element of a lubricant reservoir for supplying lubricant thereto, means to put the lubricant in the reservoir under pressure, a lubricant feeding nozzle element, said reservoir communicating lubricant under pressure thereto, said receptacle element and said nozzle element having cooperative substantially non-compressible contact faces and openings therethrough, the nozzle contact face having a concavely spherical surface, the other contact face having a dirt cutting circumferential edge portion adapted to be embraced within the spherical surface of the nozzle face and providing the sole contact therewith when the nozzle is pressed against the receptacle element from any one of a plurality of angularly different directions, to make a sealed, substantially non-yielding, lubricant conducting connection between the face openings.

3. In a lubricating apparatus, the combination with a lubricant receptacle element of a lubricant gun for supplying lubricant under pressure thereto, said gun having a lubricant feeding nozzle element, said receptacle element and said nozzle element having cooperative substantially non-compressible contact faces and openings therethrough, one of said contact faces having a concavely spherical surface, the other contact face having a dirt cutting circumferential edge portion adapted to be embraced within the spherical surface of the other face and providing the sole contact therewith when the nozzle is pressed against the receptacle element from any one of a plurality of angularly different directions, to make a sealed, substantially non-yielding lubricant conducting connection between the face openings, and an outwardly inclined guide for one of said elements to direct the other element contact face portion thereto.

4. In a lubricating system, the combination with a lubricant dispensing gun having a lubricant feeding nozzle, of a lubricant receiving element, said gun comprising means to supply lubricant under pressure to said element, the nozzle and said element having cooperating substantially non-compressible contact faces with communicating openings therethrough, one of said contact faces having a spherical surface, and the other contact face comprising an annular dirt cutting edge portion adapted to fit entirely within the border of the spherical surface of the other face and to swivel thereagainst forming a tight connection between said openings for the conduction of lubricant under pressure from said gun to the receiving element when said nozzle face is pressed against the said element from any one of a plurality of angularly different directions, after their faces are placed in contacting engagement.

5. In a lubricating apparatus, the combination with a lubricant receptacle of a lubricant gun comprising a container and a rigid lubricant feeding nozzle secured directly thereto, said receptacle and said gun nozzle having cooperative substantially non-compressible contact faces and openings therethrough, the nozzle contact face having a concavely spherical surface, the receptacle contact face adapted to be received within and to engage the concave spherical surface of the nozzle face and having a dirt-cutting circumferential edge portion providing the sole contact therewith, when the gun is directed against the receptacle and manual pressure exerted against the container from any one of a plurality of angularly different directions, to make and manually maintain a sealed, substantially non-yielding, lubricant conducting swiveling connection between the face openings.

6. In a lubricating system, the combination with a lubricant dispensing gun having a lubricant feeding nozzle, of a lubricant receiving element, said gun comprising means to supply lubricant under pressure to said element, the nozzle and said element having cooperating substantially non-compressible contact faces with communicating openings therethrough, one of said contact faces having a spherical surface, and the other contact face comprising an annular dirt cutting edge portion adapted to fit entirely within the border of the spherical surface of the other face and to swivel thereagainst forming a tight connection between said openings for the conduction of lubricant

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under pressure from said gun to the receiving element when said nozzle face is pressed against the said element from any one of a plurality of angularly different directions, after their faces are placed in contacting engagement, and an outwardly inclined guide for one of said elements to direct the other element contact face thereto.

7. In a lubricating system, the combination with a lubricant dispensing gun having a lubricant feeding nozzle, of a lubricant receiving element, said gun comprising means to supply lubricant under pressure to said element, the nozzle and said element having cooperating substantially non-compressible contact faces with communicating openings therethrough, one of said contact faces having a spherical surface, and the other contact face comprising an annular contacting portion, said nozzle face being concave, the nipple face adapted to fit entirely within the border of the concave nozzle face and to swivel thereagainst forming a tight dirt cutting connection between said openings for the conduction of lubricant under pressure from said gun to the receiving element when said nozzle face is pressed against the said element from any one of a pluraiity of angularly different directions, after their faces are placed in contacting engagement.

In testimony whereof I hereunto affix my signature this 1st day of August, 1923.

OSCAR ZERK.

558

Dec. 30, 1924.

1,520,688

F. S. BARKS ET AL

JOURNAL BOX FOR MINE CAR WHEELS

Filed April 17, 1922

Fig. 1.

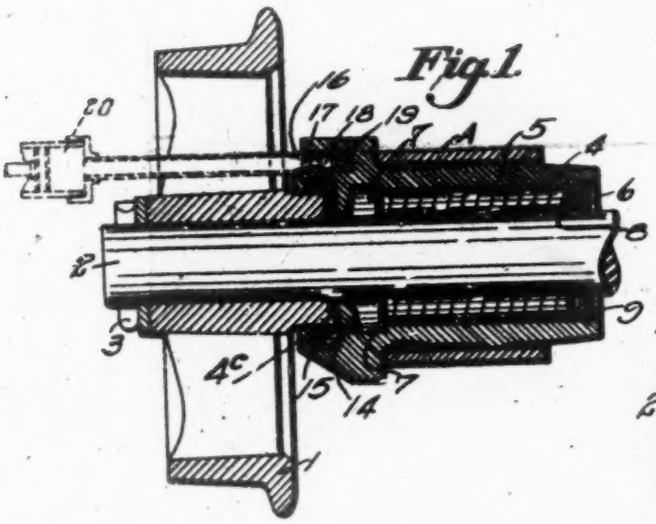


Fig. 2.

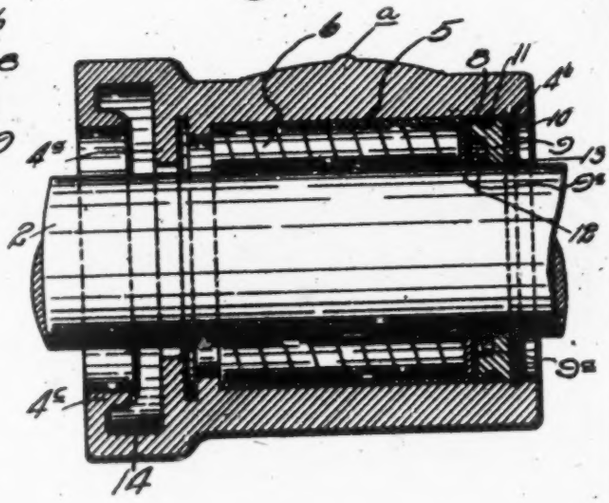


Fig. 3.

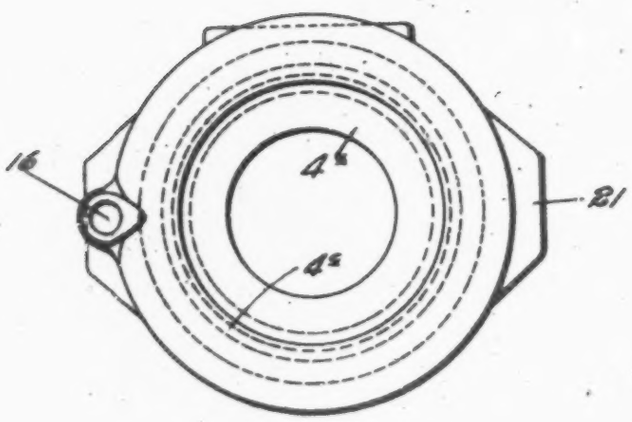
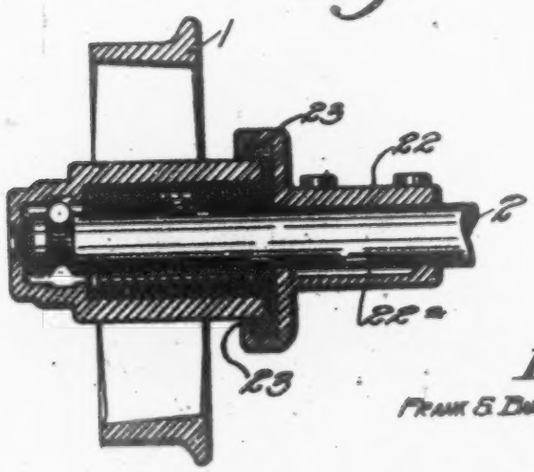


Fig. 4.



Inventors.

Frank S. Barks - George H. Ball Jr.

By. J. R. Cornwall

Atty.

Patented Dec. 30, 1924. 1,520,688

559

UNITED STATES PATENT OFFICE.

FRANK S. BARKS AND GEORGE B. BELL, JR., OF ST. LOUIS, MISSOURI, ASSIGNORS TO LINCOLN STEEL AND FORGE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

JOURNAL BOX FOR MINE-CAR WHEELS.

Application filed April 17, 1922. Serial No. 554,173.

To all whom it may concern:

Be it known that we, FRANK S. BARKS and GEORGE B. BELL, Jr., citizens of the United States, residing at city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Journal Boxes for Mine-Car Wheels, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which,—

Figure 1 is a horizontal sectional view through our improved journal box showing its relation to a mine car wheel.

Figure 2 is a vertical sectional view through the outer end of the journal box.

Figure 3 is a front elevational view of said journal box, and

Figure 4 is a modified form of journal box.

Our invention relates to a new and useful improvement in journal boxes for mine car wheels, the object being to construct the box in such a manner that it can be charged with lubricant and retain said lubricant for a relatively long period of time whereby the relatively moving surfaces will be practically self-lubricated.

Due to the character of service to which the mine cars are subjected, surfaces of the journal boxes which constitute the bearings for the axle are liable to become worn in a short space of time on account of the presence of dirt and grit, and these worn surfaces permit leakage of the lubricant from the boxes. Ordinarily these journal boxes have to be recharged with a lubricant every month or so, or whenever they "run dry" and it is one of the objects of our invention to provide means whereby the lubricant is afforded an easy and unobstructed path whereby it may return to the interior of the box and not be forced out of the box, as we have observed in other types of journal boxes now on the market. It has been proposed to seal journal boxes for mine cars and while this tends to confine the lubricant within the box and exclude grit and dust from the exterior, yet, such a sealed box will also hold the finer particles of metal which are constantly sloughed from the lubricated surfaces and cause considerable wear.

In the drawings, 1 indicates a mine car wheel and 2 the axle thereof, said wheel being held on the axle by means of a cotter pin 3. 4 indicates the journal box as an entirety, which, as shown in Figures 1 to 3, is designed to be bored for a lining 5, which lining cooperates with anti-friction rollers 6 bearing directly upon the axle. 7 indicates a washer bearing against an inwardly extending flange 4^a of the box and which washer is preferably scalloped or recessed around its outer edges to permit the passage of the lubricant therebetween.

8 indicates the cage of the roller bearing which is held in position against the washer 7 by means of an end ring 9, said end ring being preferably held in place by a bent wire 10 seated in the groove 4^b in the end of the journal box. The end ring 9, as shown in Figure 2, has an undercut portion in its inner face which provides a chamber 9^a at the end of the roller bearing frame 8, the overhanging or inwardly extending outer marginal flange of the end ring 9 engaging said frame member 8 to hold the roller bearing in position. The periphery of this end ring 9 is preferably formed with a semicircular recess in which is arranged hair-felt packing 11, the inner edge of the ring, while extending towards, permits the free movement of the axle within the ring.

By constructing the end ring 9 in the manner above described and providing chamber 9^a entirely around the roller frame member 8, we have found that lubricant pressed into said chamber by the action of the rollers, when the axle is rotated, will tend to pile up or be thrown outwardly as indicated at 12, in Figure 2, this piling continuing until the lubricant accumulates to such an extent that it will either run off or be thrown out of the bottom of the box within the chamber formed by the end ring and thus be held in the box so that said lubricant can again serve in lubricating the rollers. Any lubricant which leaks through the ring between the end ring and the axle outside of the box will likewise tend to build up under the action of the centrifugal force, as indicated at 13, and being exposed to air and dirt, this outside ring of lubricant be-

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comes relatively hard so that in fact it will in a short time form a dam or obstruction tending to prevent the further escape of lubricant to the exterior.

The outer end of our improved journal box is formed with a shroud portion 4^c spaced from the partition wall 4^a, before referred to, so as to form an elongated surface parallel with the inner end of the hub of the wheel and slightly spaced therefrom, the inner face of said shroud being undercut to provide an enlarged reservoir 14 for the lubricant, which reservoir or chamber is located within the shroud and radially beyond, and preferably entirely around the wheel opposing surface. This chamber is closed by the hub of the wheel which may extend slightly thereinto, as shown in Figure 1, there being a washer 15 arranged in the chamber and bearing against the outer face of the partition wall 4^a to take the end thrusts of the wheel hub. 16 indicates a duct or passage threaded at its outer end to receive a plug 17 against the inner face of which is normally seated a ball valve 18, said ball valve being held outwardly in position against the seat by means of a spring 19. By this arrangement, when the lubricating gun, such as indicated at 20, is used to charge the journal box with a lubricant, the ball valve may be readily unseated inwardly by the nozzle of the gun and grease injected into the journal box.

In operation, the lateral movement of the wheel and axle causes the hub which forms a wall of the chamber 14 to produce a pulsating pressure on the lubricant in chamber 14, forcing said lubricant to enter into the various communicating passages leading to the different surfaces to be lubricated. Some pressure is also exerted to force lubricant into the restricted space between the wheel hub and the opposing shroud flange. At the outer end of the passage between these opposing faces the dust always present in service combines with the grease being extruded to form a seal which effectively prevents rearward passage of the dust to bearing surfaces. The length of the passage and the slight width thereof prevents undue passage of lubricant therethrough. The lateral projection formed to accommodate the duct 16 is substantially duplicated by a solid projection 21 on the opposite side of the journal box, these two projections constituting stops for co-operating with the outer surfaces of the pedestal jaws or with the frame parts of the mine car truck frame which are provided to receive the journal box.

Another feature of our invention which we deem novel is the construction of the top bearing of the journal box which heretofore has been constructed on an arc of a circle, whereby a journal box will have swivelling or rocking contact with the frame part A resting upon it.

In our present journal box, we produce the trussed effect of the bearing by increasing the thickness of the metal in the top wall of the box from its ends toward its center, the upper surfaces of the box being described from a relatively large radius or are straight while the bearing point *a* is in the form of a transversely disposed protuberance whose upper surface is described from a circle having a relatively small radius. In practice, we have found that in tamping the sand in the mould around the pattern where the bearing surface is formed from a single radius, sand packed more tightly on one side or at one point, would produce irregularities in the casting tending to displace the intended point of contact of the journal box with respect to the frame member either to one side or the other. By providing a protuberance described from a circle of comparatively small radius, we are able to locate the bearing point of the journal box as predetermined and at the same time preserve the strength of the box and secure the benefits of the trussed bearing.

In Figure 4, we have shown a modification of our invention in which the journal box 22 is in the form of an elongated bearing with an oil chamber 22^a in its bottom. There are no roller bearings in this type of journal box, but we have shown the use of our overhanging shroud indicated here at 23, the function of this shroud being the same as that heretofore described with respect to shroud 4^c.

What we claim is:

1. In a journal box, a main bearing for an axle, and a shroud adapted to cooperate with a wheel hub to form an elongated packing surface, said shroud being undercut on its inner face to provide an enlarged lubricant reservoir around the axle and hub and between the axle bearing and the outer end of said shroud.

2. In combination, an axle, a wheel having a projecting hub, a journal box, a main bearing in said journal box, a shroud on said box adapted to cooperate with said hub to form an elongated packing surface, said shroud being undercut on its inner face to provide an enlarged lubricant reservoir around said axle and hub and between said main bearing and the outer end of said shroud.

3. In combination, an axle, a journal box, a transverse partition wall therein near one end, an extension on said wall projecting laterally therefrom, a return flange on said extension parallel with and spaced from the body of said extension to form therewith an enlarged lubricant reservoir, a wheel mounted on said axle, and a hub on said wheel

projecting into said box with its exterior periphery slightly spaced from the inner periphery of said flange and extending parallel therewith for a substantial distance to form a restricted elongated lubricant passage between said hub and flange.

4. In a journal box, a transverse partition wall near one end of the box, an extension on said wall projecting laterally therefrom, a return flange on said extension parallel with and spaced from the body of the extension to form therewith an enlarged lubricant reservoir and adapted to cooperate with the hub of a wheel to form an elongated lubricant contacting surface.

5. In a journal box, a roller bearing, a sleeve therefor, a box wall, the inner surface of which forms a support for said sleeve throughout its length and the upper surface of which inclines upwardly from each end toward the middle of the bearing, and a restricted pedestal or frame bearing for forming a predetermined line contact with a pedestal or frame at the highest portion of said upper surface.

6. In a journal box, a roller bearing containing recess, and a partition wall at the outer end of said recess, a horizontal projection on said wall spaced from the axle bore and having an inwardly extending flange cooperating with said projection to form a lubricant reservoir outside of said wall, and a passage through said wall to said roller bearing recess.

7. In combination, an axle, a journal box, including a roller bearing containing recess, a partition wall at the outer end of said recess and having a horizontal projection extending outwardly from the wall and spaced from the axle and provided with an inwardly extending flange adjacent to the axle and cooperating with said wall to form a lubricant reservoir outside of the wall, a wheel mounted on said axle and having a hub, the periphery of which extends parallel with and inside of said flange and forms therewith a restricted passage between them, said reservoir being open to said passage and to said axle and wheel contact.

8. The combination of the main portion of a journal box, a shroud having an oil chamber, and a communication between the shroud oil chamber and the chamber in the box, there being an inlet for the lubricant leading into said shroud chamber whereby the overflow from said shroud chamber will enter the chamber in the main portion of the box.

In testimony whereof we hereunto affix our signatures this 10th day of April, 1922.

FRANK S. BARKS.
GEORGE B. BELL, JR.

564

March 30, 1926. 1,578,949

F. S. BARKS

CONNECTION FOR LUBRICATORS

Filed July 24, 1924

Fig.1.

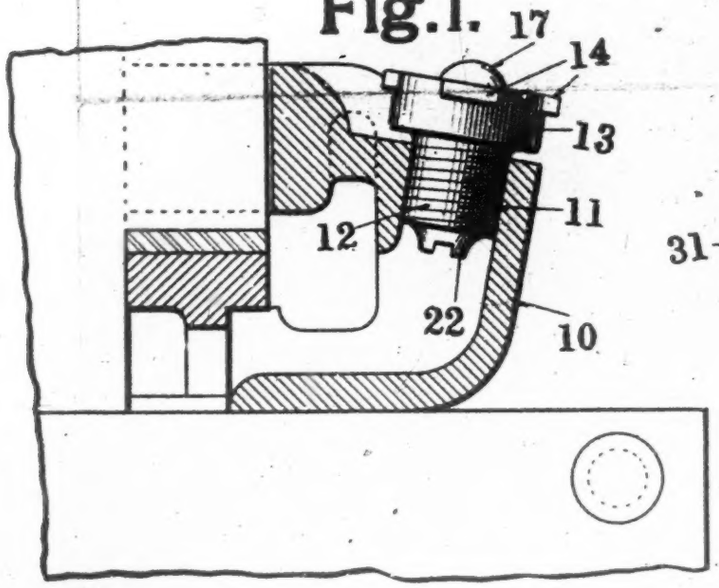


Fig.2.

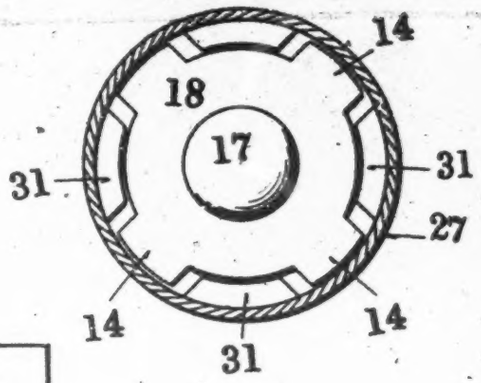


Fig.3.

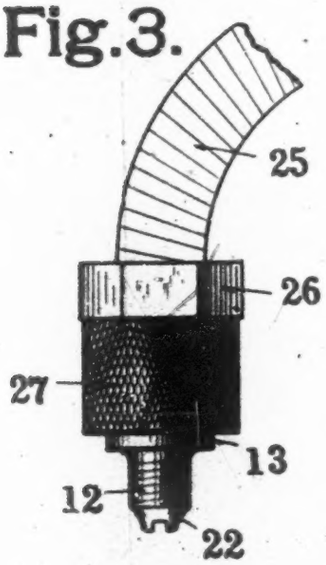


Fig.4.

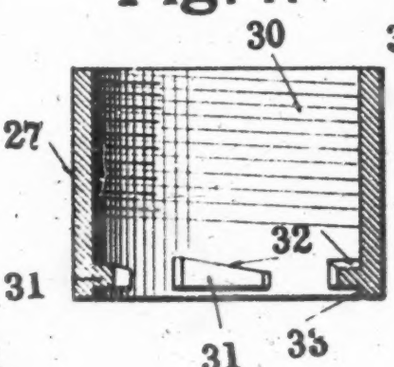


Fig.5.

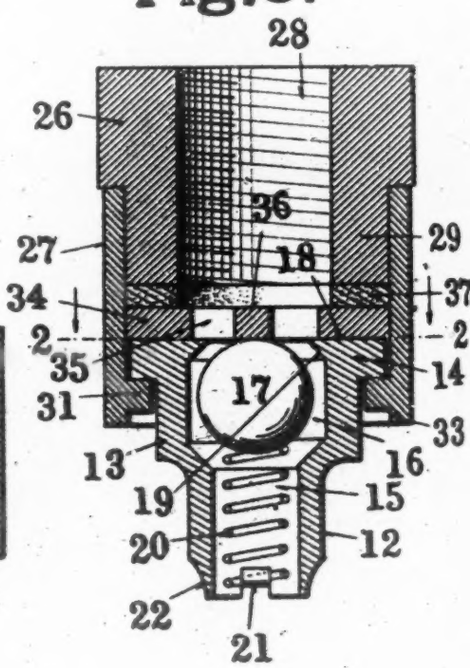
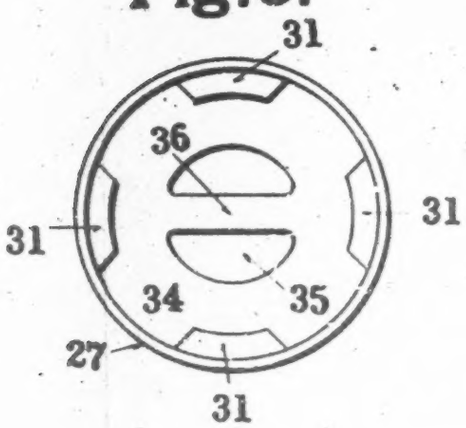


Fig.6.



INVENTOR
FRANK S. BARKS

BY E. E. Hoffman

ATTORNEY

Patented Mar. 30, 1926. 1,578,949

UNITED STATES PATENT OFFICE. 565

FRANK S. BARKS, OF ST. LOUIS, MISSOURI.

CONNECTION FOR LUBRICATORS.

Application filed July 24, 1924. Serial No. 727,864.

To all whom it may concern:

Be it known that I, FRANK S. BARKS, a citizen of the United States of America, residing at the city of St. Louis, State of Missouri, United States of America, have invented a certain new and useful Connection for Lubricators, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a connector for lubricators and is especially designed for use with lubricators in which a semi-liquid lubricant or grease is applied under pressure to the bearings of a vehicle or machine.

In the accompanying drawings which illustrate one form of a connector made in accordance with my invention, Figure 1 is a side view, partly in section, of a portion of a mine car axle box by which the fixed part of the connection is carried; Figure 2 is a section on the line 2—2 of Figure 5; Figure 3 is a side elevation showing the two parts of the connector coupled together but detached from the axle box; Figure 4 is an enlarged section of the coupler sleeve; Figure 5 is an enlarged vertical central section through both parts of the coupling; and Figure 6 is a bottom plan view of the movable part of the coupling.

As shown in Figure 1 of the drawings, the fixed part of the connector, which is composed of two separable parts, is applied to a mine car axle box indicated by the numeral 10. The box 10 is provided with a threaded opening 11 to receive the correspondingly threaded nipple 12 of the fixed part of the connection. Carried by and preferably formed integral with the nipple 12 is a cylindrical body portion 13 on which are coupling lugs 14 preferably four in number. This part of the connection comprising the nipple 12 and body 13 has formed therein a passage 15 (Figure 5) terminating at its upper end in an enlargement or chamber 16 containing a ball valve 17. The face 18 of the body 13 forms one of the contact surfaces of the connection and has its inner edge turned over at 19 to retain the ball 17 and to form a valve seat to cooperate with the ball and thus form a retaining valve for the grease in the axle box. Situated in the passage 15 and bearing against the ball is a helical spring 20 the lower end of which is held by clips 21 formed by turning over portions of the lower edge of the nipple which is reduced in thickness to facilitate this, as shown at 22.

Carried on the end of a flexible pipe 25 leading from any suitable source (not shown) for supplying the lubricant under pressure, is the movable part of the connection comprising a plug 26 and a connector sleeve 27. Passing centrally through the plug 26 is an opening 28 internally threaded for connection with the pipe 25 and the plug, which is preferably hexagonal, has a reduced cylindrical portion 29 threaded to engage with corresponding threads on the interior surface 30 of the sleeve. Formed on the surface 30 are lugs 31 having inclined upper faces 32 cooperating with the coupling lugs 14 on the portion 13. The lugs 31 are arranged at a slight distance from the end of the sleeve so as to provide a guiding flange 33 for facilitating the coupling of the two parts especially when the connector is situated in a limited space. Grease tight contact between the two parts of the connection is effected by the face 18 and an end piece 34 having a central opening 35 for the passage of the grease. Extending across the opening 35 is a base 36 adapted to contact with the ball 17, as shown in Figure 5, when the two parts of the connector are coupled, and open the valve, thus avoiding the resistance to the flow of grease which would occur if the opening of the valve depended upon the pressure of the grease itself. The end piece 34 may be formed integral with the plug 26 but I prefer to make it in the form of a separate disk as shown both for convenience in manufacture and also to provide means for easily renewing the contact surface, should it become worn, by substituting a new disk. When a separate end piece is used a packing ring 37 of rubber or soft metal is preferably used to provide a tight joint between the end piece and plug.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a device of the class described, a two part coupling, one part being provided with a valve and having external locking lugs, the other part comprising a sleeve having internal lugs and a plug threaded therein, a movable end piece for said plug within said sleeve and cooperating with said first

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named part, said end piece being retained in position by said lugs, and a packing between said end piece and plug.

2. In a device of the class described, the combination with a body portion, of a sleeve separably secured to said body portion and provided with inwardly projecting lugs, a disk member situated between said lugs and said body portion, and a nipple containing a valve, said nipple cooperating with said lugs to hold the parts together and with said disk member to form a tight joint.

3. In a device of the class described, the combination with a body portion, of a sleeve separably secured to said body portion and provided with inwardly projecting lugs, a disk member situated between said lugs and said body portion, said disk member having a central opening with a bar thereacross, a nipple containing a valve, said nipple cooperating with said lugs to hold the parts together and with said disk member to make a tight joint, said cross bar cooperating with the valve in the nipple to open the same, and a packing member arranged between said body portion and disk member.

In testimony whereof, I have hereunto set my hand this the 8th day of July, 1924.

FRANK S. BARKS.

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Feb. 13, 1934. W. Z. LINDERS 1,947,208

COUPLING

Filed April 20, 1933

FIG. 1.

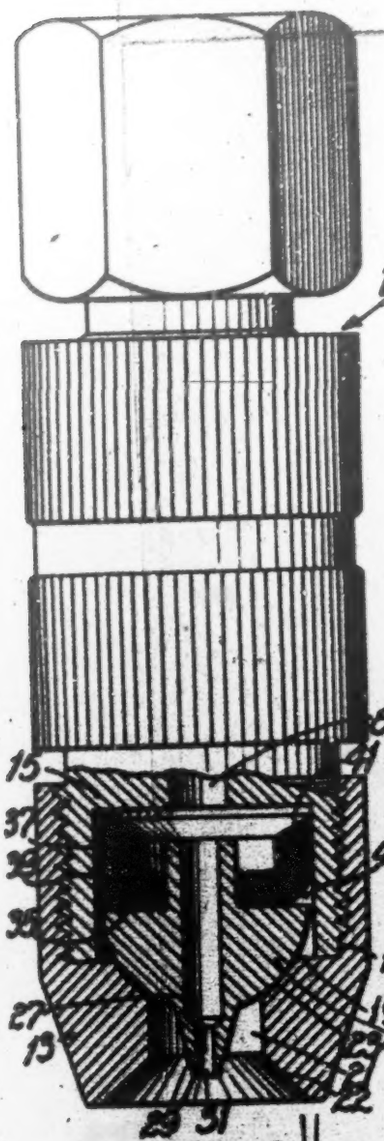


FIG. 2.

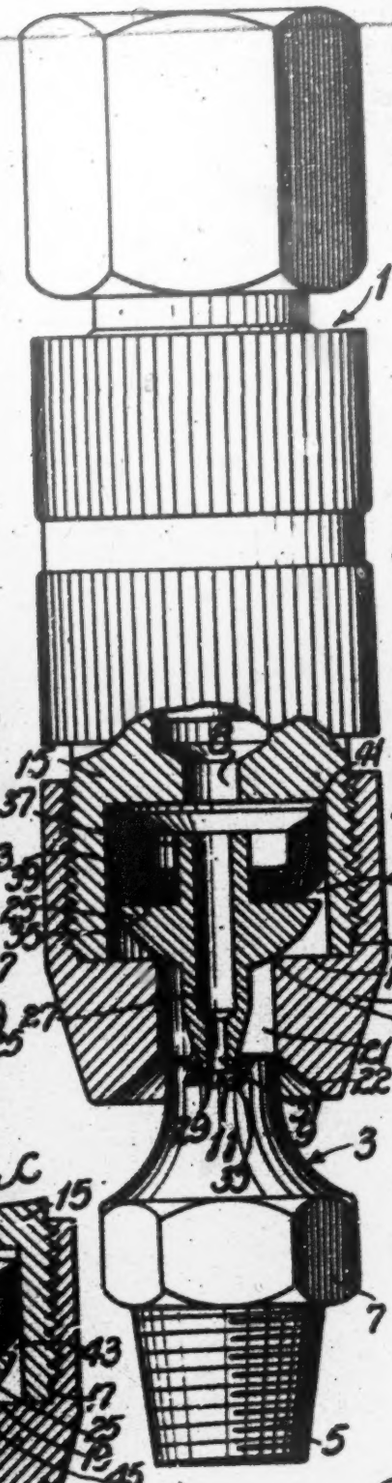


FIG. 3.

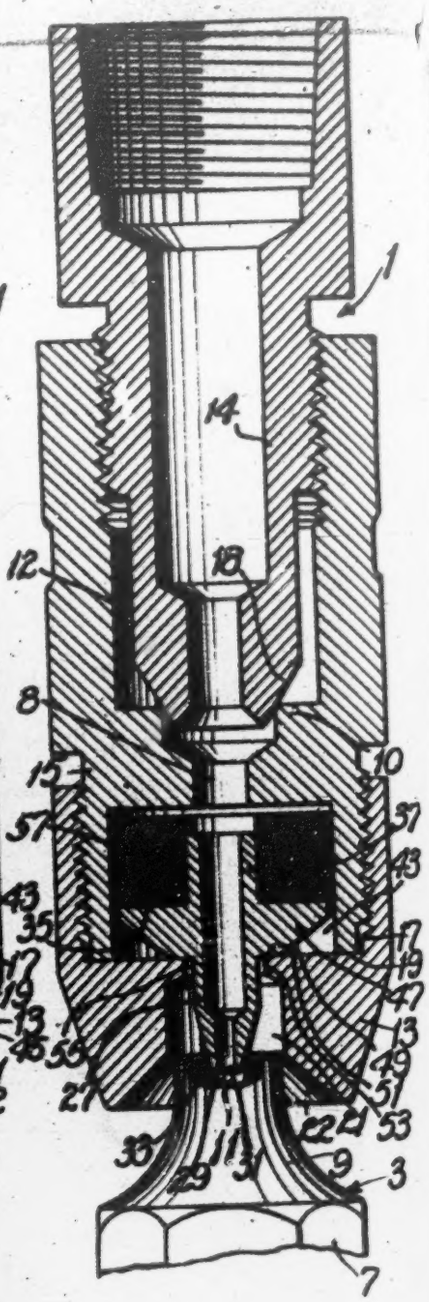
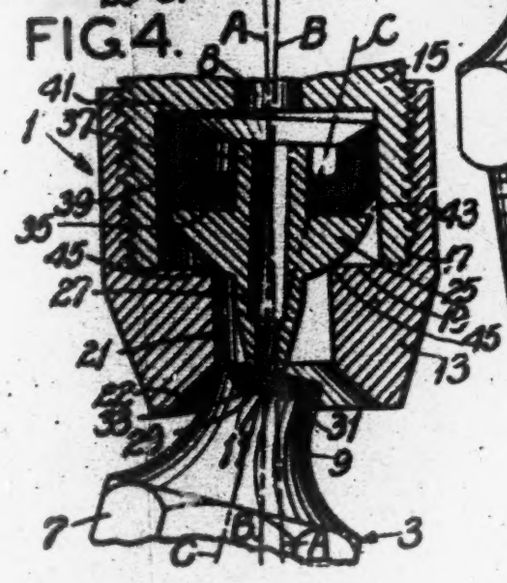


FIG. 4.



William Z. Linders,
Inventor.
Delos G. Haynes,
Attorney.

Patented Feb. 13, 1934

1,947,208

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UNITED STATES PATENT OFFICE

1,947,208

COUPLING

William Z. Linders, Normandy, Mo., assignor to Lincoln Engineering Company, St. Louis, Mo., a corporation of Missouri

Application April 20, 1933. Serial No. 666,969

3 Claims. (Cl. 285—161)

This invention relates to couplers and with regard to certain more specific features, to improved couplers for pressure lubrication, the same being an improvement upon the invention set forth in patent application of Alexander P. Fox and myself, Serial No. 651,290, filed January 12, 1933, for Couplers.

Among the several objects of the invention may be noted the provision of a push-type of coupler, in which automatic sealing against pressure, according to pressure, will be obtained at the same time that flexibility of the nozzle thereof is effected; and the provision of apparatus of the class described which shall be compact in form and simple in construction. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which are illustrated several of various possible embodiments of the invention,

Fig. 1 is a side elevation, parts being broken away to show a vertical section of one form of the invention;

Fig. 2 is a view similar to Fig. 1 but showing another form of the invention;

Fig. 3 is a vertical section showing a third form of the invention; and,

Fig. 4 is a fragmentary view illustrating by way of example, the operation of the form shown in Fig. 2.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

Referring now more particularly to the drawing, there is shown at numeral 1 a coupler applicable by an axial force to a fitting 3 to effect a connection or seal between the coupler and the fitting, said fitting and coupler being adapted to be used more particularly in high pressure lubrication systems, although being also useful with lower pressures.

The fitting 3 comprises a hollow member provided with threads at one end as shown at numeral 5, for threading the fitting into a bearing member to be lubricated. The fitting 3 is also provided with a wrench receiving, polygonal portion 7, and at its other end with a truncated portion 9. The inlet of the fitting 3 is shown at numeral 11 and is ordinarily of the order of $\frac{1}{16}$ to $\frac{1}{8}$ inch in diameter.

The coupler 1 comprises a sleeve 13 and a body 15. The sleeve 13 has a counterbore 17 which terminates at a shoulder 19 with which a concentric opening 21 communicates. The opening 21 is flared as at 22 to freely receive the truncated portion 9 of the fitting 3. The body 15 is threaded into the sleeve 13, the shoulder 19 functioning as a stop.

The cylindric opening 21 and the shoulder 19 are joined by means of a spherical socket 23 into which seats a ball flange 25, thus forming a ball-and-socket joint. The flange 25 forms a radial portion of a hollow nipple 27, the latter having a tapered, needle-like end 29 with a small opening 31 therein. The end of the nipple 29, including the opening 31 therein, is small enough to be inserted within the receiving opening 33 of said fitting 3.

The flange 25 is for the purpose of providing greater flexibility for the needle 29 when it is desired to have the coupler angularly located with respect to the coupling as a whole (see Fig. 4).

Referring to Fig. 1, it will be seen that the flange 25 is provided rearwardly with a flat portion 35 and with a hollow extension 37. Upon the extension 37 is carried a cup-shaped, self-sealing gasket 39 having one portion of its L-shaped cross section provided with a feather edge 41 which bears against the lateral wall of the hollow portion 43 in the body 15. The other leg of the L-shape rests upon the flat surface 35.

From the above it will be seen that the gasket 39 not only provides flexibility of connection between the nipple 27 and the body 15, permitting movement of the nipple 27, but also provides increasing sealing effect with increasing pressure above the gasket.

In Fig. 2 corresponding reference numerals indicate corresponding parts, the primary change being in the shortening of the spherical flange 25 and elimination of the spherical portion to form a sharp edge 45 upon which the spherical portion 25 normally rests. This form of the invention will not resist swiveling action to the extent of the form shown in Fig. 1. It also permits of less expensive manufacturing. In Fig. 4 is shown an angular relation between the body 15 and the nipple 27 (see center lines A and B), and the figure also illustrates the further angularity which may be effected between the center line B and the center line C of the fitting 3. The sum of the two angles at A—B and B—C is the total

angle of A—C between the center line of the body and that of the fitting. This figure also shows how the gasket 39 adapts itself to the angularity.

In Fig. 3 is shown a third form of the invention in which like numerals also designate like parts. In this form of the invention, instead of using a spherical flange, I prefer to use a flange 47 which has the rearwardly flat portion 35 to conform to the form of Fig. 1 but which, instead of having a spherical seat, is provided with a bevel 49 and a flat portion 51, the latter resting on the flat bottom of the chamber 43. Furthermore, the opening 21 is formed with a flange 53 between which and the needle 29 is a space 55 permitting angularity.

Back of the flange 47 is a solid but relatively soft packing 57 composed of a suitable material or composition such as alternate layers of canvas and rubber. The composition effects a radial expansion when stresses are applied parallel to its axis. Other relatively soft packings may also be used.

The operation of the form of the invention shown in Fig. 3 is to push the nipple 27 directly into the opening of the fitting 3 being guided by flare 22. Should the fitting be entered at an angle the nipple 27 will adjust its position to partially conform to the angle of the fitting sufficiently so as to insure a pressure seal between opening 33 and the nipple end 29. The adjusted position of the nipple 27 will not be disturbed as internal pressure is applied above the flange 47. In adjusting itself the nipple 27 assumes an angular position with respect to the body 15. It rocks the flat portion 51 of the flange 47 upon its seat, the washer 57 taking up the required play. Furthermore, as internal pressure is applied above the flange 47, the gasket 57 tends to effect a better seal. This construction has the advantage of insuring positive parallel center-line relationship between the body 15 and the nipple 27, the same being determined by the right-angularity between the surface 51 and the center line of said nipple 27. After internal pressure has been relieved by withdrawing nipple 27 from fitting 3 this center line relationship has the advantage of straightening the nipple 27 for application to another fitting similar to fitting 3.

The body 15 (Fig. 3) above the position of the nipple 27 is provided with a passage 8, a shoulder 10, and a threaded recess 12, into which recess is threaded a second larger form of nipple 14, the latter threadably receiving tubing which communicates with known pressure lubricating system or apparatus. The nipple 14 has a bevelled lower end 18 adapted to cooperate with said shoulder 10 to effect a seal. Either the nipple 27 or the nipple 14 may be used in lubricating, depending upon the fitting to be served.

Due to line contact of relatively small circumferential length of shoulder 10 and bevel 18, friction is reduced to a minimum to facilitate screwing the body 14 by manual effort sufficiently tight to insure a leak-proof connection or seal between shoulder 10 and bevel 18.

A further purpose of the large nipple 14 is to clean the small nipple 27 in the event it should become clogged which eliminates the necessity of a strainer. This is accomplished by unscrewing the nipple 14 from the body 15 and inserting the beveled end 18 into the flare 22. The bevel 18 contacts the inward edge of flare 22 effecting a leak-proof connection or seal which can be maintained by manual effort while sufficient pressure is developed in the interior of nipple 14 to force the obstruction from nipple 27.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A coupler comprising a body having a hollow interior and an exterior opening communicating therewith, a hollow nipple extending into said opening, said nipple having a flange within the opening, a seat on the body portion beneath said flange, and resilient packing means between said nipple and the walls of said hollow interior, the seat and the flange being relatively flat at the region of the engagement, the seat being formed to permit passage therethrough of the nipple and rocking of the flange on said flat seat, said flange having a conical relieved portion adapted to permit rocking about a point substantially within the periphery of the flange and hence without excessive lifting of the packing.

2. A coupler for fittings with relatively small openings, comprising a body having a hollow interior portion and a relatively small exterior opening communicating with said hollow interior, said opening being surrounded by an inward flange on the body portion, a flanged nipple extending through said opening and adapted to enter said relatively small fitting openings, said body flange comprising a support for the nipple flange, the nipple and the body portion having relative rocking movement at said support, and having relatively flat engaging surfaces, a conical relieved portion on the nipple flange adapted to determine rocking movement substantially on said body flange, and a resilient washer engaging the hollow interior and said nipple flange, whereby movement of the nipple with respect to the body is possible without deleterious distortion of the washer and hence at the same time a proper seal between the body and the nipple.

3. A coupler for fittings having relatively small openings, comprising a body having a hollow interior and a relatively small exterior opening communicating therewith, a hollow nipple extending through said opening and adapted to enter said fitting openings interiorly, said nipple having a flange within said interior, a flange seat on the body portion beneath said flange, and forming said exterior opening, and resilient packing means between said nipple and the walls of said hollow interior, said nipple being subjected to internal fluid pressure only, the seat and the nipple flange being relatively flat at the region of engagement and held in engagement only by said pressure, said flat engagement and packing permitting rocking of the nipple and ensuring centralizing of the nipple upon disappearance of the cause of rocking, said nipple flange being cut away conically to determine rocking well within the periphery of the nipple flange.

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May 22, 1934. A. P. FOX ET AL 1,959,529

COUPLER

Filed Jan. 12, 1933

FIG. 1.

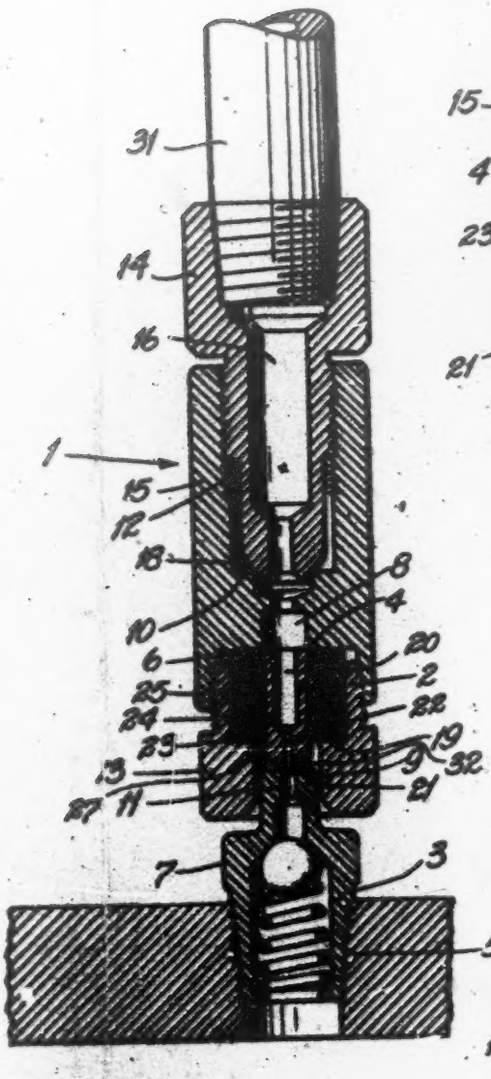

FIG. 3.

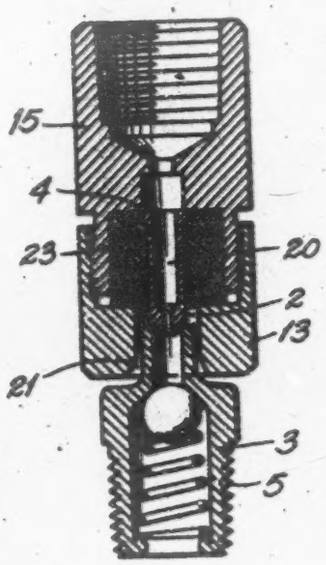

FIG. 2.

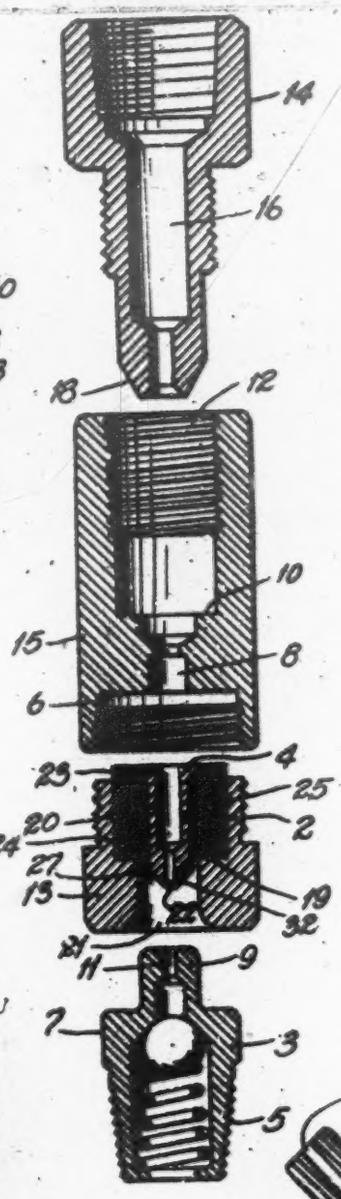

FIG. 5.

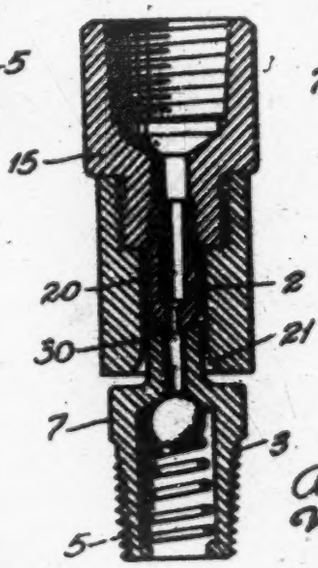

FIG. 4.

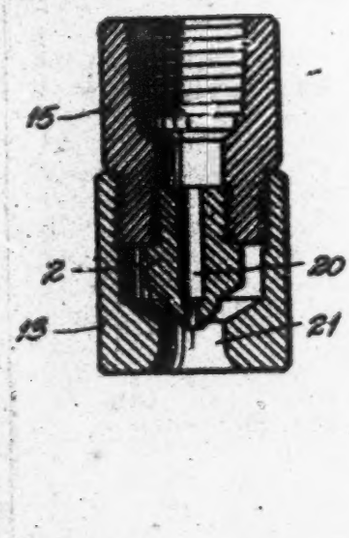

FIG. 6.

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Patented May 22, 1934

1,959,529

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UNITED STATES PATENT OFFICE

1,959,529

COUPLER

Alexander P. Fox, University City, and William Z. Linders, Normandy, Mo., assignors to Lincoln Engineering Company, St. Louis, Mo., a corporation of Missouri

Application January 12, 1933, Serial No. 651,299

2 Claims. (Cl. 285—161)

This invention relates to couplers, and with regard to certain more specific features to an improved type of coupler for pressure lubrication.

This invention is an improvement upon the invention set forth in the patent application of Frank S. Barks, Serial No. 531,440, filed April 20, 1931, for Coupler.

Among the several objects of the invention may be noted the provision of a coupler for pressure lubrication systems adapted to provide a lapped sealing connection between said coupler and a fitting with less reaction at a given pressure; and, the provision of a coupler of the class described which provides an improved mount for the member with respect to the lapping seal. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structure hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which is illustrated several of various possible embodiments of the invention,

Fig. 1 is an axial section of a coupler applied to a push type of fitting;

Fig. 2 is a view of the parts of Fig. 1 shown separated;

Figs. 3, 4, and 5 are views similar to Fig. 1 showing alternative constructions; and,

Fig. 6 is an axial section showing an angular form of fitting.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

Referring now more particularly to Fig. 1, there is shown at numeral 1 a coupler applicable by axial force to a push type of fitting 3 to effect a seal between the coupler and the fitting, said fitting and coupler being adapted to be used more particularly in high pressure lubrication systems, although being also useful with lower pressures.

The fitting 3 comprises a hollow member provided with threads at one end as shown at numeral 5, for threading the fitting into a bearing member to be lubricated. The fitting 3 is also provided with a wrench receiving, polygonal portion 7, and at its other end with a receiving portion 9. The inlet of the fitting 3 is shown at numeral 11 and is ordinarily of the order of $\frac{1}{16}$ to $\frac{1}{8}$ inch in diameter.

The coupler 1 comprises a sleeve 13 and a body 15. The sleeve 13 has a counterbore 24 which terminates at a shoulder 19 at which a concentric opening 21 begins. The opening 21 is shaped to freely receive the portion 9 of the fitting 3.

A packing 23, which has a passage 25 therethrough, is positioned in the counterbore 24 and is seated against the shoulder 19 and is thus prevented from moving farther into the member 13. The passage 25 is sufficiently small to provide an edge 27 which overlaps the narrower portion of the opening 21, as shown in Figs. 1 and 2.

The packing 23 is preferably composed of a resilient, grease-resisting composition comprising relatively thin, alternate layers of canvas and rubber, the planes of which are normal to the axis of the device. The composition effects a uniform radial expansion throughout its length when stresses are applied parallel to its axis. However, other relatively soft packings may be used.

The entire length of the passage 25 is taken up with a small nipple 2 having an upwardly located bevelled flange 4. The flange 4 on its upper surface is flat and flush with the upper surface of the packing 23. By this means there is presented to the flat bottom of a counterbore 6 of the body 15, a flat face constituting the upper surface of the packing 23 and of the flange 4. Thus, when the members 13 and 15, the former being threaded exteriorly and the latter interiorly, are threaded together, the packing 23 is jammed so as to effect a radial seal against the nipple 2 and the recess 24, an endwise seal against the inner end of the counterbore 6, and an endwise seal against the shoulder 19.

The body 15 above the position of the nipple 2 is provided with a passage 8, a shoulder 10, and a threaded recess 12, into which recess is threaded a second and larger form of nipple 14, the latter threadably receiving tubing 31 which communicates with known pressure lubricating system or apparatus. The nipple 14 has a passage 16 communicating with the passage in the tubing 31 and a bevelled lower end 18 adapted to cooperate with said shoulder 10 to effect a seal.

As shown in Fig. 2 the nipple 14 is separable from the body 15 and in its separated condition may be used as a pressure nozzle for delivering lubricant to desired openings, particularly to those larger than those in fittings such as 3. When the nipple 14 is connected (Fig. 1), it forms a part of the body 15, that is, when the device is to be used on a fitting such as 3.

The small nipple 2, for attachment to fittings such as 3, has a passage 20 for communication

with the passage 8 with which it aligns. The outlet 22 of the passage 20 is quite small. As shown aboye, fittings such as 3 as now supplied on the market have a quite small inlet 11. The lower end of the nipple 2 is provided with a tapered portion 32 by means of which the nipple 2 may be entered within the inlet passage 11 of the fitting 3. The taper is preferably of the order of 45 degrees. The outlet passage 22 of the nipple 2 is made smaller than the inlet 11 of the fitting 3. The inlet passage 11 being of the order of one-sixteenth to one-eighth of an inch in diameter, the passage 22 will be smaller than this dimension so that an interior lap is effected between the bevel 32 and the inlet of the fitting 3. The advantage of this is that there is a lap seal between the nipple 2 and the fitting.

As an example, as high as seven thousand pounds per square inch has been positively sealed without the effort required to hold two thousand pounds per square inch with the conventional push type of nozzle. This is attributed to the fact that manual effort is exerted only to overcome the reaction of the unit pressure developed over the area of the hole in the fitting instead of any greater amount. The arrangement provides for sealing, such that the very minimum amount of area shall be subjected to pressure.

In Fig. 2 is shown the separation of the members 13 and 15. The parts may be thus separated when it is desired to remove the nipple 2 and replace the same. All that is necessary is to push it and the retaining packing 23 from the counterbore 24 of the separated member 13. The nipple 2 may then be removed from the packing 23 and a new nipple inserted in the packing and the packing returned to the member 13. The parts 13 and 15 are then screwed together; or, a complete new packing and nipple assembly may be replaced.

An advantage is that the nipple 2, which in view of the interior application to the fitting 3, must be rather small, does not require threads to be placed thereon, the same being supported by the resilient packing. Ordinarily, it is difficult to place small and strong threads on members of this nature, particularly where they must be concentric. Furthermore, the support of the nipple 2 by the packing 23 permits of some eccentricity of the nipple 2 because it will self-align with respect to the fitting 3.

In Fig. 3 is shown a modification in which the advantages of Figs. 1 and 2 are attained, but instead of threading the member 13 exteriorly and the member 15 interiorly for joining the same, the interior threads are placed on the member 13 and the exterior threads are placed on the member 15. By this means, the threads are sealed against leakage by a greater area of packing than is the case in the forms in Figs. 1 and 2. It will be noted that the cylindrical sides of the packing are effective to protect the threads, as well as the upper end of the packing; whereas in Figs. 1 and 2, only the upper end of the packing is effective in aiding in effecting a seal against leakage through the threads.

In Fig. 4 is shown a packless form of the invention wherein the members 13 and 15 are threaded together and the nipple 2 is threaded into the body 15. It is preferable in this event to make the body of the nipple 2 somewhat larger and heavier so as to accommodate a somewhat coarser thread. Hence manufacture is easier. A straight, shouldered thread is used in this form. It retains many of the functional advantages of the form of Figs. 1 and 2, but not the manufacturing advantages, nor the self-aligning feature.

In Fig. 5 is shown the manufacture of another packless form of the invention wherein smaller taper threads are used for joining the nipple 2 and the body 15. It will be appreciated that this form may be practicable under certain manufacturing conditions, but it is believed that the forms in Figs. 1, 2 and 3 are the most practicable.

All forms have the advantage of the spacing of the nipple 2 from the inner walls of the recess 21, also the lap seal and reduced pressure reaction.

From the above it will be seen that the invention has many advantages. It also has the advantage in effecting a seal against the inside edge of the inlet of the fitting. This means that the sealing engagement is made with a seat of the fitting which is not subjected to damage. Fittings are very frequently rendered faulty and useless by damage to the outside sealing seat occasioned by abrasions, nicks or distortion. The slightest irregularity along the line of contact between the fitting and the coupler will result in excessive leakage at the extremely high pressures handled. By means of the present invention a line of contact is used which is not subjected to abrasion and the like.

To afford further protection to the sealing edge of the fitting the end may be provided with the shallow countersunk portion 30 (Fig. 5), (of any desirable sectional contour) by means of which the sealing edge itself is in a plane depressed from the face of the fitting, where it is protected against surface scratches or marks which might otherwise disturb the sealing edge when it is flush with the fitting face.

A further practical advantage which results with this form of coupler is the fact that it does not permit of being applied at an angle with respect to the fitting, but must of necessity be applied substantially straight on the fitting. The advantage in this lies in the fact that the most effective seal is to be had only when couplers are applied substantially straight. Thus each fitting is contacted by pressure on a straight line perpendicular to its face, and where angular entries of the coupler must be made, special fittings are provided such as shown in Fig. 6.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. A coupler comprising a body portion having an opening therethrough and a counterbore therein, packing material in the counterbore, a nipple supported by the packing material and passing therethrough, and a member threaded to the body and adapted to compress said packing, said last-named member having a recessed portion surrounding a portion of the nipple extending from the packing, said extended portion of the nipple having a conical end and an opening therethrough which is smaller than the opening of the fitting against which the coupler is adapted to be pressed.

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2. A coupler comprising a body portion having an opening therethrough and a counterbore therein, packing material in the counterbore, a nipple supported by the packing material and passing entirely therethrough, a member threaded to the body adapted to compress said packing, said nipple having a wall adapted to withstand any substantial inward movement of the packing under compression, said threaded member having a recess portion surrounding a portion of the nipple extending from the packing, said extended portion of the nipple having a conical end and an opening therethrough which is smaller than the opening of the fitting against which the coupler is adapted to be pressed, the extension of the nipple being adapted to prevent the fitting from contacting with said packing.

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July 10, 1934. F. S. BARKS ET AL 1,966,278

COUPLER

Filed May 29, 1933

FIG. 1.

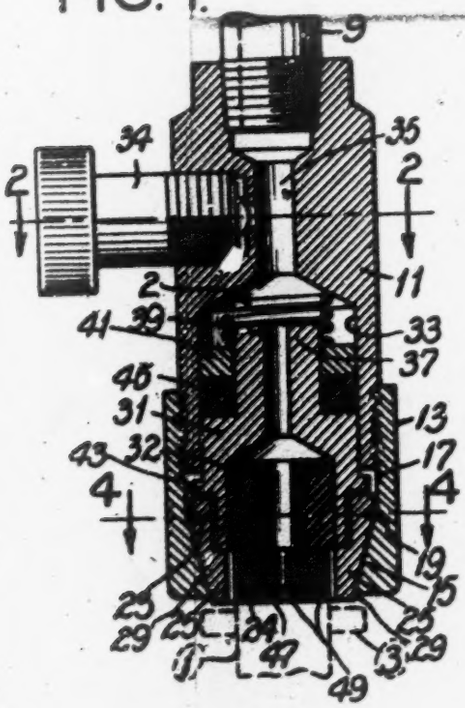


FIG. 5.

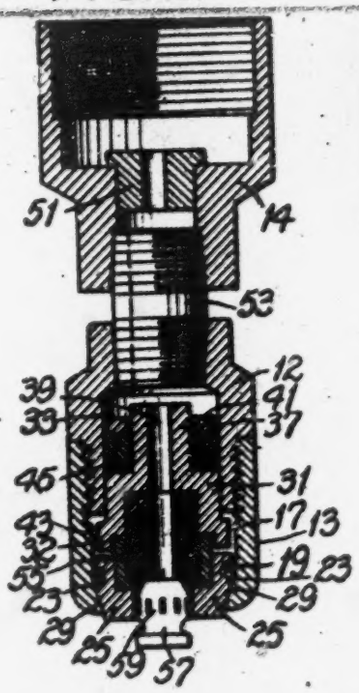


FIG. 8.

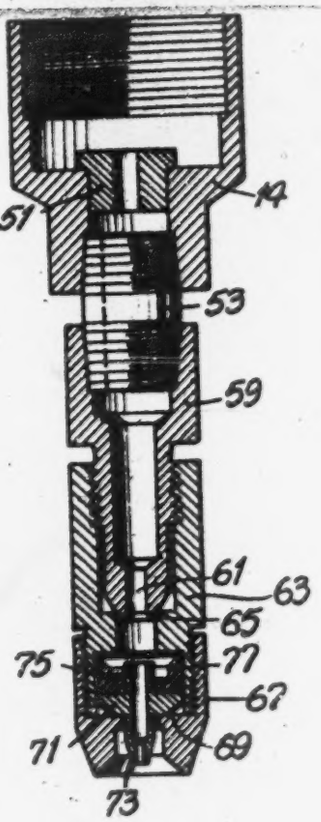


FIG. 2.

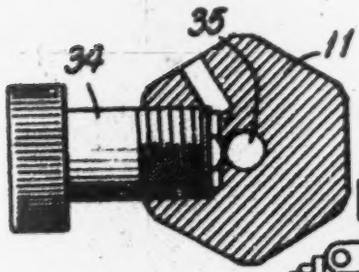


FIG. 4.

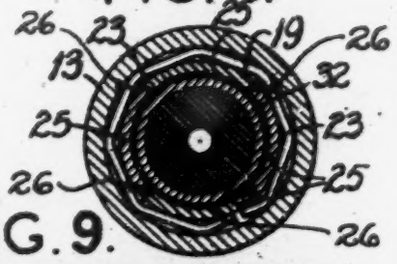


FIG. 9.

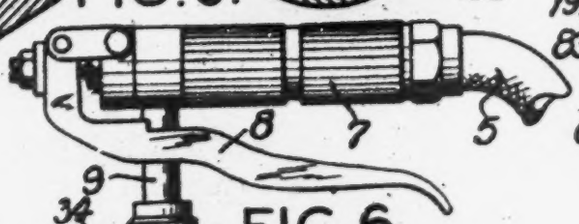


FIG. 7.

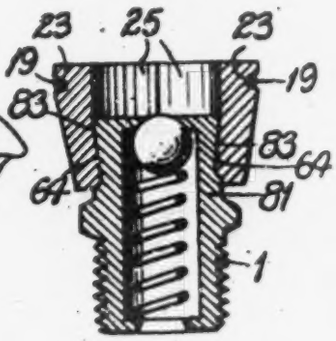


FIG. 3.

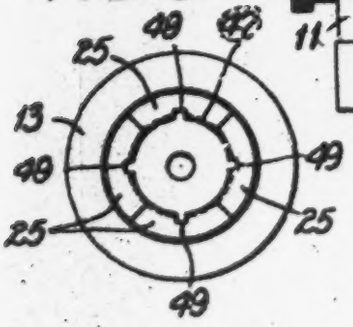
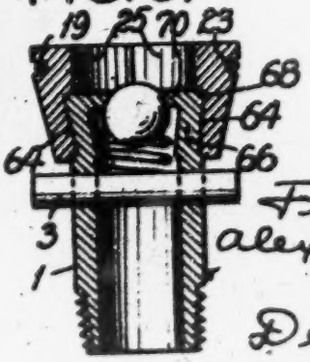


FIG. 6.



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Delos D. Haynes,
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Patented July 10, 1934

1,966,278

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UNITED STATES PATENT OFFICE

1,966,278

COUPLER

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Application May 29, 1933, Serial No. 673,228

5 Claims. (Cl. 285—176)

This invention relates to couplers, and with regard to certain more specific features, to couplers for attaching lubricant lines which are under pressure to lubricant-receiving fittings and the like.

Among the several objects of the invention may be noted the provision of a coupler which is adapted to be more easily applied to fittings than the bayonet type of couplers heretofore used, and requiring no twisting or tilting operation in making an application thereof; the provision of a coupler of the class described which automatically grips and couples when pressure is turned on to deliver grease through the coupler to the fitting; the provision of a coupler of this class which automatically releases when said pressure is turned off; the provision of apparatus of the class described having freely movable gripping portions which do not suffer fatigue and subsequent breakage; the provision of apparatus of this class which is positively operable and relatively simple and compact in form. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which are illustrated several of various possible embodiments of the invention,

Fig. 1 is a longitudial section showing one form of the invention;

Fig. 2 is a cross section taken on line 2—2 of Fig. 1;

Fig. 3 is a lower end elevation of Fig. 1;

Fig. 4 is a cross section taken on line 4—4 of Fig. 1;

Fig. 5 is a view similar to Fig. 1, showing an alternative attachment for a different type of fitting;

Fig. 6 is a fragmentary section showing a jaw modification;

Fig. 7 is a view similar to Fig. 6 showing another jaw modification;

Fig. 8 is a view similar to Fig. 5 showing another attachment; and,

Fig. 9 is a side elevation showing the device attached to a valve.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

is shown at numeral 1 a fitting having a cross pin 3 which ordinarily serves for making an attachment of a bayonet type of coupler. Heretofore, bayonet couplers have been used to cooperate with a pin such as 3 to form a connection but this requires, first, longitudinal movement of the coupler and then a manual twist in order to effect an application, and then turning on of pressure for delivering to the fitting fluid such as grease. The present invention does not make use of the pin 3, nor does it require the turning or twisting movement above specified nor tilting before turning on the pressure.

It is to be understood that the coupler described herein is placed upon the end of a rigid pipe 9 which communuicates with a flexible portion 5 by way of a stop valve 7. A suitable compressor feeds the coupler through the line 5, stop valve 7 and pipe 9. The valve 7 is adapted to be held in the hand as a handle while manipulating the coupling, and at the same time the operating handle 8 of the valve 7 may be manipulated. Hence one hand is ordinarily sufficient to effect attachment and flow control, as will be shown.

Numeral 11 designates the body of the coupler to which the inlet pipe 9 is attached. To the body 11 is screwed a chuck ring 13 having a hollow conic portion 15 at the outer end thereof and formed as at 17 to provide an inner chamber. The body 11 and ring 13 form a chuck per se.

Within the inner chamber 17 is a polygonal spring 19 which reacts radially against the interior of the chamber and lies within aligned grooves 23 of a plurality (four in this instance) of jaws 25 (see also Fig. 3).

In the aggregate, the jaws 25 are formed conically at their lower ends as shown at numeral 29 to cooperate with the hollow conical portion 15 of the chuck 11, 13. By this means, the jaws are rendered separable when they are forced into the chamber 17. They approach one another if forced from the chamber 17 through the said conical portion 15.

In order to move the jaws 25 out through said opening 15, they are engaged in a counterbore 24 therein by a plunger cup 31 which slidably fits within a counterbore 33 of said body 11. The counterbore 33 is connected with the source of pressure in the line 9 by means of an opening 35. A manually operable bleeder valve 34 permits of bleeding off pressure from clogged bearings with which the coupler may communicate.

The cup 31 includes a central stem which is

hollow as shown at 39. The stem 37 accommodates a relatively resilient washer 45 which also contacts with the wall 33. The washer 45 is backed by a pressure ring 41. A second washer 32 within the hollow interior of the cup 31 serves to seal against the top of the fitting 1. A shoulder 43 on the cup 31 limits its upward movement by engaging the lower edge of the body 11, thus limiting the amount of inward movement of the jaws 25. The outward movement of the jaws is limited by their conical lower ends 29 contacting the hollow conic portion 15 of the chuck ring 13. A coil spring 2 compressed slightly between the end of bore 33 and the pressure ring 41 maintains the several jaw sections in firm relationship. This is not always necessary, and to illustrate the point, such a spring has been omitted from Fig. 5.

The interior portions of the jaws 25 are peripherally serrated as at 47 in order, by a high local pressure, to cut through and positively squeeze from the outer surfaces of the fitting 1 any lubricant which might cause slippage. Longitudinal channels 49 serve to permit trapped lubricant to escape when the coupler is applied to a fitting so as to insure a positive contact between the top of the fitting 1 and the face of the sealing washing 32, thus eliminating the possibility of the fitting being forced from the coupler by pressure being exerted on the trapped lubricant between the fitting and washer before said pressure actuates the jaws to grip the fitting.

This may also be accomplished by effecting clearance at points 26 (Fig. 4) between jaws, provided the fitting is strong enough to withstand crushing. If it is not strong enough, and it is desired to use said clearance, the inward movement of the jaws may be limited by the counterbore 24 thereof engaging the lower end of cup 31 therein. The limiting action should not be so much as to prevent the serrations 47 from biting.

The operation of the device is as follows, referring to Fig. 1:

The jaws 25, without pressure behind the cup 31, are normally somewhat separated. A slight spacing will be found between adjacent jaws under these conditions. The cup 31 is positioned upwardly, and likewise, the packing 45 and pressure ring 41. The upper limiting position occurs when the shoulder 43 strikes the lower edge of the body 11. It will, however, be understood that the parts have not necessarily been raised to this position.

Application is made to a fitting such as 1 by merely axially moving the coupler with respect to said fitting, thereby positioning the jaws 25 around the cylindric end of the fitting. This action contacts the washer 32 with the upper surface of the fitting, thereby forcing back the cup 31 so that the shoulder 43 thereof may contact with the lower edge of the body 11. The operator cannot force the coupler on to the fitting 1 far enough to effect interference between the jaws 25 and the pin 3.

Next, pressure is admitted through the line 9, as by operating the valve 7. The introduction of the pressure as above described, accomplishes the forcing of lubricant into the chamber 33, thus forcing back the body 11 by reaction, the washer 45 preventing leakage.

The reaction results in pulling back said chuck 11, 13 so that the conical opening 15 is drawn back over the conical faces of the jaws 25, thereby pinching the jaws together to the

that the design is arranged so that the spaces between the jaws 25 before pressure is admitted are substantially eliminated after said pressure has been admitted. In this connection the closing in of the spaces between the jaws limits their inward travel towards the fitting. When the jaws are closed tight, that is, their respective sides abutting so that no space exists between them, there is provided a clearance between the lower end of cup 31 and the recess of the jaws into which said end fits in order to insure an effective grip on the fitting 1. By limiting the inward movement of the jaws, biting in of the jaws into the fitting 1 is prevented. After the jaws are clamped on the fitting, the internal pressure sealed by washer 45 also presses the washer 32 to a seal.

Any tendency for lubricant or grease to pocket between the jaws, gasket 32 and the fitting 1 is prevented by the longitudinal grooves 49 in the jaws which permit escape of lubricant before the same is compressed and before the same can function to effect sliding of the jaws from the fitting under reaction engendered. Furthermore, the serrations 47 bite through any lubricant film to effect a grip. If space between jaws is substituted for the grooves 49, then inward movement may be limited as above described by contact between counterbore 24 and the lower end of cup 31, the serrations 47 still being permitted to bite through the film.

As long as the pressure is maintained, the lubricant will flow and the grip will be effective as above described, the gasket 32 providing a seal against the top of the fitting and the gasket 45 preventing leakage to the threads between members 11 and 13.

As soon as the pressure is released, as by turning off the valve 7 in the line 9, the excess pressure in the chambers 33, and cup 31 leaks off through the fitting 1, thus reducing the pressure. There being no more pressure within the chambers, the chuck 11, 13 may be forced down causing the jaws to lose their hold.

It will be noted from Fig. 1 that the element 13 of the chuck may be removed from the body portion 11 thereof. The threads between these two members may be loose and of the type adapted to be turned by hand. They may be thus made because they are protected from leakage by the washers 45 and 32. This permits of the easy removal and the easy application of the attachment shown in Fig. 5.

To make the attachment of the Fig. 5 device, the member 13 is removed merely by unscrewing it, and carries with it the jaws 25 which are held in place by the spring 19. The member 14 of the Fig. 5 attachment may be screwed to the body 11, a bushing 51 pressing against the washer 32 to effect a seal. The member 14 is attached by a nipple 53 to a chuck in which like numerals designate like parts to the above. The chuck member 13 is attached to a body 12 having therein jaws 25 held by a spring 19 and engaged by a shouldered washer 55 which is set into the plunger cup 31. The open end of the washer 55 fits into the counter bore of plunger 31 and the shouldered end fits into the recess in the jaws, the purpose of the shoulder being twofold, that is, to prevent the sealing washer 32 from being pushed out, due to pressure, and likewise to limit the inward travel of the fitting 57 so that its barrel portion cannot enter far enough to stick on the shoulder of the jaws. The cup

therethrough and around the nipple 37 is a washer 45 backed by a ring 41. A washer 32 associated with the cup 31 serves to seal against a fitting 57.

The fitting 57 is of a class differing from the fitting 1 in that it does not have a cylindrical exterior surface but a barrel-like exterior surface in which have been preformed certain grooves 59. Inasmuch as the grooves 59 serve to introduce the localized pressure necessary for squeezing out lubricant film from the contacting surfaces and for carrying the lubricant longitudinally, there is no necessity for serrating the insides of the jaws 25, nor for grooving them.

The operation of the device of Fig. 5 when attached to the body 11 of Fig. 1 is analogous to that above described.

In Fig. 8 is shown another attachment in which like numerals designate like parts. In this construction the member 14 is again adapted to be threaded to the member 11 of Fig. 1 after the member 13 with the jaws 25 have been removed. The device of Fig. 8 shows a nozzle 59 attached to the nipple 53. This nozzle has an outlet 61 which is adapted to be inserted into lubricant receiving openings of certain fittings 1 provided a cap 63 is removed. When the cap 63 is in place, it seals at 65 against the nozzle 61. This cap 63 has threaded thereto a second lower cap 67 having a shoulder 69 upon which rests a disc 71 from which projects a needle-like nozzle 73. A hollow stem 75 is surrounded by a washer 77 which seals according to pressure. The purpose of the attachment 63 (with associated parts) is to permit of feeding lubricant to the nipples of ordinary push-type lubricant fittings which are now on the market.

The operation of the Fig. 8 device, after the member 14 has been properly attached, is to press and insert either the nozzle 61 or the nozzle 73 into the respective openings to which they are adapted, the valve 7 being subsequently opened. There is no gripping action on the fitting of this form of the coupling, the same being described to show the utility of the loose threads between members 11, 13.

In Fig. 6 are shown jaws slightly modified but applied to the same type of fitting as shown in Fig. 1. In this form of the invention, the jaws are given a slightly conical interior form 64, the cone enlarging upwardly. Thus when the jaws are forced against the fitting 1, the thin walls 66 of said fitting are compressed inwardly. It will be understood that the deformation is so small that these walls 66 resume their original cylindric shape when the jaws 25 are released. The upper portion 68 of the fitting is not likewise compressed, because of the disc-like area 70 which does not deform as much as the portion 66 therebelow. This accounts for the holding action.

In Fig. 7 is shown a form analogous to that shown in Fig. 6 but applied to a form of fitting in which the pin 3 has been eliminated. In this form of fitting, the wall is made thicker. The walls 81 are made thick and shaped to correspond at 83 to the cones 64 of the jaws 25. In this form, it is not intended that the walls shall deform, the same being made heavy enough and/or of material strong enough to prevent it. Other modified jaw forms may be used, the above being exemplary and preferred.

It will be recognised that in the forms of the inventions shown in Figs. 1 and 5, that endwise [illegible] tween surfaces, one of which is serrated. While we have found that the cooperation between such surfaces, is adequate under high pressure, the forms of the invention shown in Figs. 6 and 7 may be desirable under certain conditions.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. A coupler for fittings comprising a plurality of separate jaws adapted to surround a fitting, a chuck comprising a body and a freely separable member thereon formed about and cooperating with the jaws, the cooperating surfaces between the member and the jaws being such as to force the jaws together upon endwise movement of the chuck, said chuck having a communicating means with a line under pressure which feeds the coupler, a hollow plunger having a cup-like opening facing the fitting, sealing means between the plunger and the chuck and sealing means in said opening of the plunger and contacting the fitting, said plunger being engageable by the jaws whereby endwise movement of the chuck under internal pressure causes clamping of the jaws on the fitting when they surround the same, said sealing means preventing any possibility of leakage through the attachment between the separable parts of the chuck, whereby different chucks having different jaw forms may readily be substituted, and means whereby the jaws are resiliently held to the part of the chuck removed upon separation, said last-named means maintaining the operating relationship of the jaws within said part removed.

2. A coupler for fittings comprising a plurality of separate jaws adapted to surround the fittings, a hollow chuck formed about the jaws, a body communicating with a line under pressure and having a quick detachable connection with said chuck, means for clamping the jaws to a fitting upon increase in internal pressure within said body, and means for maintaining said jaws in position in the chuck when the chuck is removed, whereby a quick reassembly may be accomplished.

3. A coupler for fittings comprising a plurality of separate jaws adapted to surround the fittings, a hollow chuck formed about the jaws, a body communicating with a line under pressure having a quick detachable connection with said chuck, means for clamping the jaws to a fitting upon increase in internal pressure within said body, and means for maintaining said jaws in position in the chuck when the chuck is removed, whereby a quick reassembly may be accomplished, said last-named means comprising a spring resiliently pressing against the interior of the chuck and interlocked with the jaws.

4. A coupler for fittings comprising a plurality of separate jaws adapted to surround the fittings, a hollow chuck formed about the jaws, a body communicating with a line under pressure having a quick detachable connection with said chuck, means for clamping the jaws to a fitting upon increase in internal pressure within said body, and means for maintaining said jaws in position in the chuck when the chuck is removed, whereby

ff At Bottom

last-named means comprising a non-circular spring resiliently pressed against the interior of the chuck at its outermost portions and interlocking with grooves in the jaws at more inner portions.

5. In a coupler for fittings having a plurality of jaws adapted to surround the fitting, a hollow chuck formed about the jaws so as to force the jaws together upon endwise movement of the chuck, the jaws of the chuck having serrations thereon adapted to cut entirely through any film of grease or the like between the fitting and the jaws, means for relieving trapped grease on the fitting from pressure tending to effect separation of the coupler and the fitting comprising longitudinal passages formed across the serrations in said jaws.

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Aug. 6, 1935. F. S. BARKS ET AL 2,010,174

LUBRICATING APPARATUS

Filed Oct. 13, 1934

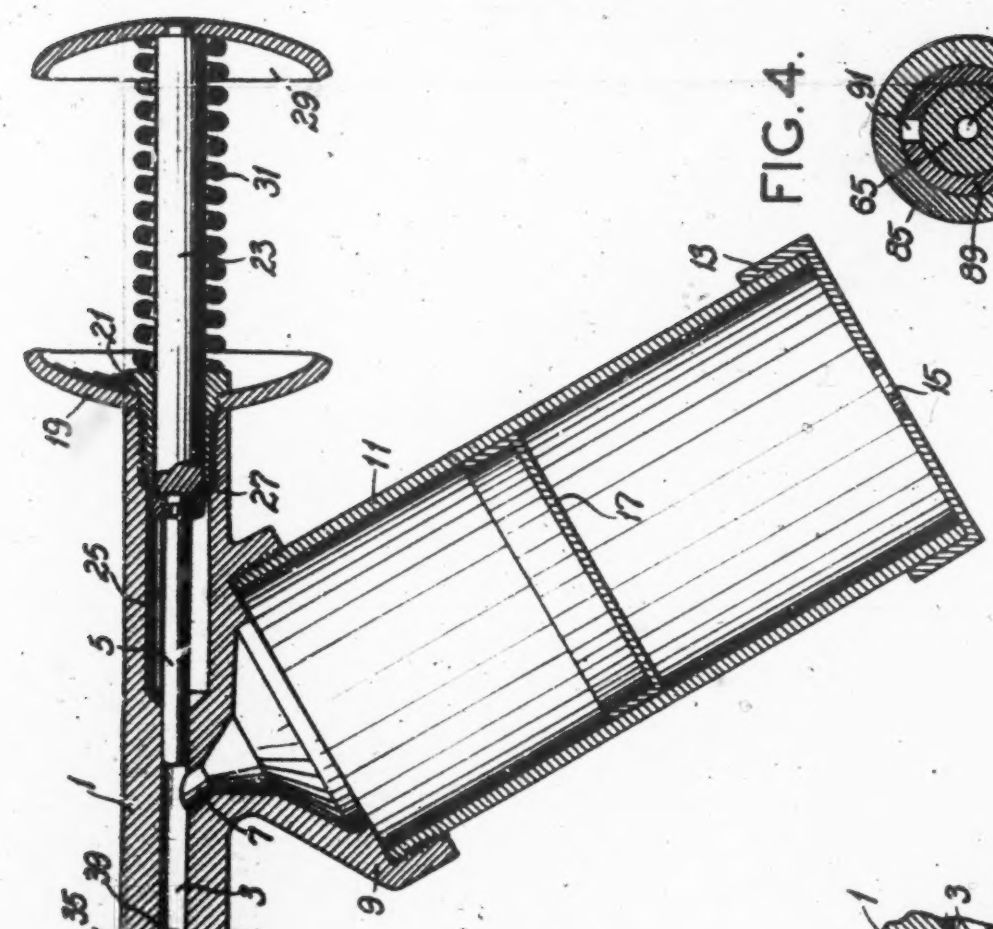

FIG. 1.

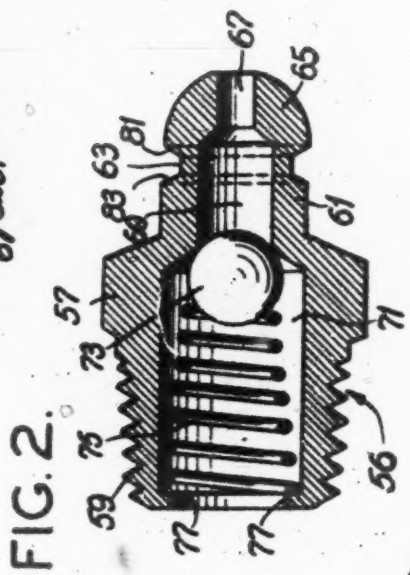

FIG. 2.

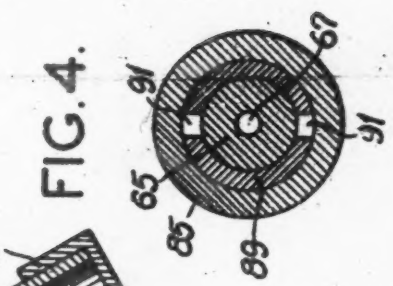

FIG. 4.

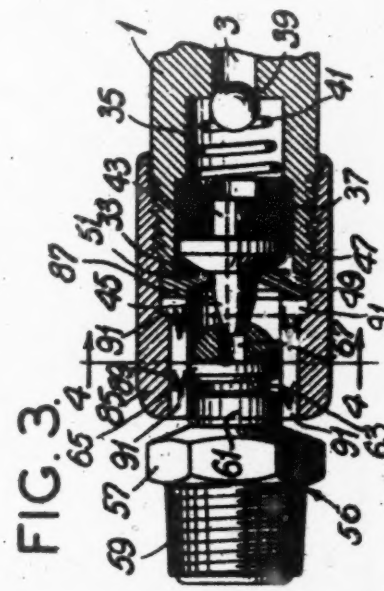

FIG. 3.

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atented Aug. 6, 1935 2,010,174

585

UNITED STATES PATENT OFFICE

2,010,174

LUBRICATING APPARATUS

Frank S. Barks, St. Louis, Alexander P. Fox, University City, and William Z. Linders, Ferguson, Mo., assignors to Lincoln Engineering Company, St. Louis, Mo., a corporation of Missouri

Application October 13, 1934, Serial No. 748,188

3 Claims. (Cl. 285—161)

This invention relates to lubricating apparatus, and with regard to certain more specific features, to a gun for forcing lubricant under pressure into receiving fittings and the like.

Among the several objects of the invention may be noted the provision of a lubricator hand gun which may be conveniently and quickly guided onto and applied without substantial leakage to successive fittings, and quickly operated to provide a substantially high lubricant pressure, and which may be quickly removed; the provision of a lubricating gun of the class described, which has interchangeable nozzles, each particularly adapted for a given class of work but each of which may be operated with equal convenience in its respective class of work; the provision of a lubricating gun of the class described which is light and compact enough to be used with one hand, if desired, but not necessarily so, the same carrying a substantial charge of lubricant; and the provision of apparatus of this class which is convenient in form and economical to manufacture. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which are illustrated several of various possible embodiments of the invention,

Fig. 1 is a longitudinal section taken through the apparatus, showing one form of nozzle;

Fig. 2 is an enlarged longitudinal section of one class of fitting to which the apparatus may be applied;

Fig. 3 is an enlarged longitudinal section showing an alternative form of nozzle; and,

Fig. 4 is a vertical cross section taken on line 4—4 of Fig. 3.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

Referring now more particularly to Fig. 1, there is shown at numeral 1 a barrel-shaped body in which is a main bore 3 for slidably accommodating a plunger 5, said bore 3 having an inlet 7 just ahead of the rearmost position of said plunger 5. The inlet 7 is covered by the plunger 5 when the latter is forced forwardly. Said inlet 7 widens out and slopes rearwardly and downwardly, the same being finally formed as an angular cap 9 which is integral with the body portion 1.

The cap 9 is threaded to detachably receive an angularly located lubricant supply cylinder 11. The cylinder 11 has a lower cap 13 through which is formed an opening 15. Within the cylinder 11 is a free piston 17. To load the supply cylinder 11, the free piston 17 is forced downwardly against the cap 13, thus covering the opening 15. The cylinder 11 is then filled and screwed to the cap 9. Upon reciprocation of the plunger 5 and withdrawal of lubricant through the inlet 7, the supply in the cylinder is gradually exhausted and the piston 17, under atmospheric pressure through opening 15, follows the exhausting supply.

Rearwardly, the body 1 is provided with a stationary grip 19, the latter being held in place on the body 1 by means of a threaded bushing 21. The rear end of the plunger 5 is fastened to a guide stem 23, the latter passing slidably through the opening of said bushing 21 and into a rearward counterbore 25. The counterbore 25 is somewhat larger in diameter than said guide stem 23. A packing 27 is used between the guide stem 23 and said rearward counterbore 25 to seal against leakage.

At its rearward end the guide stem 23 is provided with a movable handle 29 which is similar in shape to the stationary handle 19. A spring 31 reacts between the bushing 21 and said movable handle 29. The handles 19 and 29 are of dome-like shape. They are so formed that when separated fingers are placed under the stationary handle 19, the palm of the hand may be used for pressing inwardly the movable handle 29. This permits of supporting and operating the device with one hand. Of course, if desired, the other hand may aid the operation by gripping the supply chamber 11, although this is not necessary. The cylinder 11 then functions as a convenient grip.

At its forward end, the body 1 is provided with stepped counterbores 33 and 35, the former accommodating a relatively soft packing 37 and the latter a ball check valve 39, normally held in seated position by a spring 41. The spring 41 reacts against said packing 37.

In the opening at the opposite end of the packing 37 is positioned a cylindric extension 43 of a delivery nipple 45, said nipple having a flange 47 which has a flat face where it engages the packing 37, but which is provided with a beveled portion 49 opposite the packing. The beveled portion provides a rocking edge 51 adapted to cooperate with the inner flat surface of a metal retaining washer 53 held in place on the end of the

body 1 by means of a threaded sleeve 55. The extension 43, flange 47 and nipple 45 are hollow to form a conduit.

Further details in regard to the rocking action of the flange 47 on the inner face of the member 53 may be obtained from the United States Patent 1,947,208 of William Z. Linders (see Fig. 3 therein). In general, the edge of the flange 47 clears the bore 33 enough to permit rocking of the edge 51 on said washer 53. There is enough clearance between the hole through the washer 53 and the nipple tip 45 to permit of this action. It is to be understood that the rocking action is of a magnitude which, relative to the purpose in hand, is enough to permit of some angularity of the body 1 with respect to the nipple 45. Since the nipple 45 may rock slightly in the end of the fitting 56, the angle of the body 1, with respect to the fitting 56, is the sum of the angle of the body 1 with respect to the nipple 45 and that of the nipple 45 with respect to the fitting 36. Hence a smaller nipple angle is required for a given body angle, both measured with respect to the fitting 56.

The fitting comprises a hexagonal portion 57 back of which is a screw threaded portion 59 for screw connecting the fitting to passages which are to be lubricated. Ahead of the flange 67 extends a cylindric receiving tip 61, grooved as shown at 63 and provided with an inlet portion 65 which is substantially semi-spherical or convex in form. The groove 63 constitutes a reduced neck portion. An inlet bore 67 communicates with a central counterbore 69, and said counterbore 69 communicates with a rearward and larger bore 71. A ball check valve 73 seats against the end of the counterbore 69 and is normally held in position by means of a coil spring 75 reacting from an inwardly directed flange 77.

It will be seen that the symmetrical guide sleeve 55 is hollow interiorly and is provided endwise with an inwardly extending flange 79. This flange is preferably beveled as at 82 on its inward side. The groove 63 is beveled on its forward side, as shown at numeral 81 and may be beveled at 83, as shown, although the latter bevel is not important. The bevels 81 and 82 cooperate to provide clearance, as will appear.

The clearance between the opening through flange 79 and the base of the spherical portion 65 of the fitting 56 is such as to provide a loose or free, guiding fit. The opening through the flange is substantially equal to the fitting diameter at the bottom of the convex head portion but slightly larger for free clearance. Thus, as the gun is pressed on the fitting 56, the flange 79 effects a guiding action over the portion 65. A nicety of aim in applying the gun to the fitting is not necessary. As the nipple 45 enters the opening 67 in the fitting 56 a seal is effected and the guiding action of the flange 79 ceases, because said flange 79 comes opposite the groove 63. Hence, thereafter, considerable free rocking of the body 1 may be effected with respect to the fitting 56 without tending to loosen the lubricant-tight pressure seal between the nipple 45 and the interior of the opening 67.

Merely to provide a guide for sending the nipple 45 into the opening 67 is not enough. This is because after the nipple has been guided home, the ordinary guiding structure will effect a second point of rocking which will loosen the nipple 45 from that with which it engages, when the body 1 is inadvertently rocked, as when effecting a pumping action on the handle 29. With the present invention, full guiding action is obtained in applying the apparatus for attachment to the fitting and after it has been contacted, the guiding action ceases and permits ample rocking about one center only at the end of the fitting without prying action about some other center, which would loosen the sealing contact. The bevels 81 and 82 cooperate to insure proper clearance between flange 79 and groove 63.

It is to be understood that as the body 1 rocks (inadvertently) angularity is effected between the nipple 45 and said body and also angularity is effected between the nipple and the fitting. As above shown, the purpose of allowing the angularity between the nipple and the body is to reduce the angularity between the nipple and the fitting, with an overall angularity between the body 1 and fitting 55 which is of the order of that which obtains when a pumping action goes on. The flange 79 and groove 33 takes care of this overall rocking without prying the nipple 45 from the opening 67.

In operation, assuming the chamber 11 to be filled, the operator grasps the separated handles 19 and 29 and applies the sleeve 55 to the fitting 56. The flange 79 cooperates, first with the spherical end 65 of the fitting. Only an approximate alignment is necessary because, as the gun is further pressed to the fitting, the flange 79 rides toward the cylinder 69 over the end 65 and guides the nipple 45 into the opening 67. After this has occurred, the flange 79 comes opposite the groove 63. The operator then presses the handle 29 toward the handle 19 repeatedly, thus effecting ejection of lubricant from the nipple 45 and into the fitting 56. Any rocking action of the body 1, engendered by the pumping action between handles 19 and 29 is provided for without effecting a disconnection between nipple 45 and fitting 55, for the reason above given. As the supply in the chamber 11 is reduced, the piston 17 follows under atmospheric pressure to maintain a supply at the inlet 7.

Referring now more particularly to Fig. 3, it will be seen that the barrel 1 is alternatively provided with a threaded sleeve 85 which holds in position a split sleeve 91 having a head member 87. However, instead of using the inwardly extending flange 79 of Fig. 1, the outer end of the sleeve 85 is bored straight for receiving the inner split sleeve 89 whereby the sleeve 85 and said head 87 may be held in place at the end of the body 1 and spaced around the nipple 45.

The bore through the split sleeve 89 and the outside diameter of said sleeve 95 are arranged, for example, as follows:

Assuming that the outside diameter of the cylindric portion 61 and base of head 95 of the fitting is .249 inch, the sleeve 89 is formed with a bore in its unstrained condition which is .250 inch. The sleeve is then closed in so that its final inside dimension is .249 inch. It is then hardened. This leaves no clearance between the split sleeve 89 and fitting 56. The clearance between the outside diameter of the sleeve 89 and the inside diameter of the sleeve 85 is .002 inch.

The result of the above relationship is that there is an accurate sliding fit between the split sleeve 89 and the cylindric portion 61 of fitting 56 which effects a definite alignment, so that the cylinder 1 cannot be rocked under any condition to any degree which would loosen the nipple 45 from its position in the receiving opening 67, after application of the gun to the fitting. The springing action of the split sleeve 89 assures a snug, sliding, frictional fit. At the same time,

there is not so much clearance between the outside of the sleeve 89 and the inside of the sleeve 85 that a permanent set can be effected in sleeve 89 by repeated application of the device to fittings. That is to say, if a split sleeve were used, without being suitably backed, it would soon take on a permanent set and thereby become loose. If it were tightly backed up there would be no spring at all and the snug application could not, in practice, be brought about in the first instance.

While it is not desired that we be limited to the above dimensions, they are given as being exemplary of the proportions desired. The functions to be effected by the proportions are a snug, sliding, frictional fit interiorly between the split sleeve 89 and the tip of the fitting and at the same time a backing of the split sleeve by a rigid member 85 at such a distance that some springing may be effected without the split sleeve taking a permanent set, that is, it cannot be stressed beyond its elastic limit.

The sleeves 55 and 85 and included parts are interchangeable. The sleeve 85 of Fig. 3, which maintains a rigid alignment between fitting and gun, is most useful in applications where it is desired to be able to attach a gun to the fitting and have it remain there temporarily while the operator effects maneuvers. For instance, if the car which is being lubricated is not jacked up, this form of sleeve is preferable because an attachment to the nipple may be made and then the operator's body placed in an advantageous position to effect pumping. Analogous situations will suggest themselves.

The form of the sleeve shown in Fig. 1 is preferable where the car is raised and the operator can get beneath it, such that application of the gun and a pumping stroke may be made simultaneously but at somewhat various angles with respect to the fitting. The sleeve of Fig. 1 is also somewhat preferable for use with power pumps having flexible outlets reaching up to the ball check 39, instead of the hand pump. This is because the outlets of power guns are not rigid and it is therefore more difficult to maintain a direct alignment with the fitting. Furthermore, the parts associated with the power coupler and hose are ordinarily so heavy that a sleeve such as shown at Fig. 3 would have an undue bending moment applied to it. However, it is not to be understood that the structure of Fig. 3 is not applicable to power guns, because under proper conditions of design it is also useful for the purpose.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. A coupling for connecting a lubricant-supply conduit with a lubricant-receiving fitting of the form including a bored convex head and a reduced neck portion, said coupling comprising a bored nipple adapted to enter the bore of the fitting to form a seal, the coupling being mounted in the end of the conduit and having a symmetrically positioned surrounding sleeve spaced from said nipple and having an inwardly extending flange at a predetermined distance beyond the end of the nipple and providing an opening adapted to pass over the head of the fitting and to register with said neck when the seal is effective, whereby the nipple is insured proper entry in the bore of the fitting, and angling is permitted without tendency of prying the nipple from the fitting.

2. A coupling for connecting a lubricant-supply conduit with a lubricant-receiving fitting including a semi-spherical head having a reduced neck portion and a bore therein, said coupling comprising a bored nipple mounted in the delivery end of the conduit and adapted to enter the bore of the fitting to form a seal therewith, and a surrounding sleeve spaced from the end of the nipple and having an inwardly extending flange at a predetermined distance beyond the end of the nipple, said flange providing an opening adapted to pass loosely over the head of the fitting and being located at said neck when the seal is effective; whereby the nipple is insured proper entry into said bore in the fitting, and the flange may project into said neck during angling of the coupling, without danger of breaking the seal.

3. A coupling for connecting a lubricant-supply conduit with a lubricant-receiving fitting of that general form including a centrally bored round head with a reduced neck portion, said coupling comprising a bored nipple mounted in the delivery end of the conduit and adapted to enter the bore of the fitting to form a seal therewith, and a symmetrically positioned surrounding sleeve spaced from said nipple and having, at its free end, at a predetermined distance beyond the end of said nipple, an inwardly extending flange providing an opening substantially equal in diameter to the round head of the fitting, and located at said neck when the seal is effective; whereby the nipple is insured proper entry into said bore, and angling of the coupling is permitted while preserving the seal.

FRANK S. BARKS.
ALEXANDER P. FOX.
WILLIAM Z. LINDERS.

543 DEFENDANT'S EXHIBIT A-49.

No. 16,086 (Cut) A. D. 1904

Date of Application, 20th July, 1904—Accepted, 13th Oct., 1904

Complete Specification.

An Improved Connection for Beer Taps, Water Taps, Spirit Taps, Pipe Joints, and the like.

John Griffin 13 Benedict Road Brixton, S.W., Engineer and William Henry Making Holland St. Brixton S.W. Licensed Victualler, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a connection for beer taps, spirit taps, water taps, steam and other joints, the same will be made in any suitable metal, different parts may be made some in gun metal, some in malleable iron, some in brass or any other metal that may be deemed beneficial to use in part or parts as the case may be. The taps and other joints used in connection with this invention will be prepared with a collar either cast in section or in a separate form for the purpose of converting if required any existing tap or joint, a bridge frame or case will be so arranged at the one end, so that the same will drop in position at the back of the collar or nozzle of the tap or other parts for this purpose, the other end will be prepared with a hole either plain or screwed, so that an adjustable screwed sleeve, may be run through same, a lining having a collar near the one end for the purpose of holding in position a rubber, leather or other washer, will be run through the adjustable screwed sleeve, standing through same far enough to attach a beer, hose or other pipe, so that the adjustable screwed sleeve can be operated freely, and so that the same may be the more clearly understood, we will proceed to describe in full detail the nature of this our said invention,

Fig—1 is a side view,
Fig—2 is a front view,
Fig—3 is a plan view,
Fig—4 is a section through 1—2,
Fig—5 is a disconnected view,

A is a bridge frame or case, B is an adjustable screwed sleeve, C is a lining, plain or screwed, D is a washer, E is the recessed nozzle of the tap or joint, F is the seat in recessed nozzle of the tap or joint. The bridge frame or case A having in connection the adjustable screwed sleeve B, and the plain or screwed lining C at one end, the other end is placed over the back of the recessed nozzle E, after which the adjustable sleeve B, is screwed or turned round by means of a plain, milled or notched circular plate, or an arm or arms set at given distances in section or apart, as the case may be, which pushes forward the lining C having in connection the washer D, up against the recessed seat F, which forms a perfect joint, to disconnect this joint, the screwed sleeve B, must be turned the opposite way, until the bridge frame can be raised sufficiently to clear the nozzle E.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:

1. The adjustable screwed sleeve B, having through same the lining or clutch lining C.

544 2—The bridge frame A combined with the adjustable screwed sleeve, B, and the lining C.

3—The general combination as herein shown by our drawings and specification.

Dated this 20th day of July 1904.

John Griffin.
William Henry Making.

Redhill: Printed for His Majesty's Stationary Office, by Love & Malcomson, Ltd.—1904

U.S.D.C., N.D. Ill., E.D.
STEWART-WARNER CORP., PLF.
v.
LEVALLY, ET AL., DFTS.
EQUITY 13,[illegible]
DFT. EXH. A-49
3 SHEETS SHEET 3

Translation of French Patent [illegible]

A.D. 1904. JULY 20. No. 16,[illegible].
GRIFFIN & [illegible] COMPLETE SPECIFICATION.

DEFENDANT'S [illegible]

Republic of France.

National [illegible] of Industrial Property

Letters Patent [illegible] 20, 1902.
No. [illegible]

Machines.
Parts.

FIG. 1

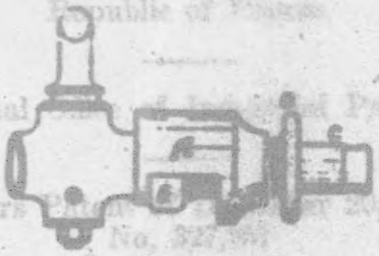


FIG. 2.

Fifteen-year patent, applied for on December 20, 1902, by Mr. Pinol (Paul), [illegible] Pipe Coupling [illegible]

(Issued March 31, 190[illegible] on June 26, 1903).

This invention refers to [illegible] of pipe coupling.

This system is characterized by the arrangement of a deformable ring, composed of several parts, [illegible] this deformable ring being lodged in the interior of a [illegible] screw mounted on the female part of the coupling; the part forms [illegible] to be connected and the ring [illegible] screw, but its diameter, within [illegible] augmented or diminished.

The description given herebelow [illegible] to the attached drawings representing several couplings in accordance with the invention. Fig. 1 is a part [illegible] of a coupling in closed condition.

FIG. 3.

Figs. 2, 3 and 4 represent separately [illegible] ring, fig. 2 being a diametral section, fig. 3 [illegible] section and fig. 4 a side view [illegible].

Fig. 5 represents [illegible] divided into three parts.

Fig. 6 represents a [illegible] as the preceding one in which the junction [illegible] by means of two rings.

Fig. 7 and 8, 9 and 10, 11 and 12 represent various forms of rings.

Fig. 13 and 14 likewise refer to various forms of rings.

Fig. 15 represents an [illegible] of coupling.

FIG. 6.

This drawing is a reproduction of the original one reduced scale

577 DEFENDANT'S EXHIBIT A-70.

Republic of France

National Office of Industrial Property

Letters Patent of December 20, 1902
No. 327,557

V.—Machines.
3.—Parts.

Fifteen-year patent, applied for on December 20, 1902, by Mr. Pinel (Paul), for Instantaneous Pipe Coupling System.

(Issued March 31, 1903; Published on June 26, 1903).

This invention refers to a system of pipe coupling.

This system is characterized by the arrangement of a deformable ring, composed of several parts, united by an elastic band, this deformable ring being lodged in the interior of a locking screw mounted on the female part of the coupling; this part forms body with one of the tubes to be connected and the ring cannot come out of said locking screw, but its diameter, within the screw, can be freely augmented or diminished.

The description given herebelow refers to the attached drawings representing several couplings in accordance with the invention. Fig. 1 is a part cross section of a coupling in closed condition.

Figs. 2, 3 and 4 represent separately a cut-open ring, fig. 2 being a diametral section, fig. 3 a front section and
578 fig. 4 a side view.

Fig. 5 represents in front a ring divided into three parts.

Fig. 6 represents a coupling of same type as the preceding one in which the junction is however effected by means of two rings.

Fig. 7 and 8, 9 and 10, 11 and 12 represent various forms of rings.

Fig. 13 and 14 likewise refer to various forms of rings.

Fig. 15 represents an inclined plane variation of coupling.

The coupling represented by fig. 1 shows A and B as the tubes to be connected. On the threaded end *a* of one of them is screwed a socket C, ending by two flanges *c* c^1; tube B at its extremity is provided with grooves *b*, upon which one or several deformable rings D may be inserted, such as shown by fig. *w*, 3, 4 and 5. (Grooves as per a^1 are ordinary grooves, such as intended for the joining of rubber tubes, canvas and leather hose).

The deformable ring is divided into two, three or a greater number of parts; the various component parts of a ring are united by an elastic band *d*, surrounding it by a gorge arranged at its periphery.

The ring, or rings D, is or are set into socket C at the portion between the extremity of part *a* and the flange c^1, and between the latter and the ring is inserted washer E, made of rubber, leather, asbestos or other convenient packing
579 Material of compressible kind.

When tube B with its part *b* is inserted into the ring, the latter, on account of being composed of several parts, gives way, and as soon as shoving in of tube B ceases, the ring retakes its normal shape and glides into one of the grooves *b*. In order to effect the junction, Socket C is screwed on part *a* of tube A, in such manner that the joining ring E is compressed between the extremity of part *a* and ring D, the latter being maintained in its screwed-on condition by flange *c* of socket C; this ring D now being rigid and set into one of the grooves *b*, tube B is firmly held and cannot separate from tube A, the connection being perfectly tight.

In order to effect dismounting, socket C is unscrewed to break off the tightening, and tube B is slightly inclined, causing a deformation of ring D which permits the withdrawal of said tube B. The junction and the separation of the two tubes by means of the present system can be effected very rapidly.

Fig. 3 shows a coupling in which two rings are made use of instead of one.

Such as stated above, ring D can be composed by any number of parts, as may be seen from fig. 2, 3, 4, 5, 7, 8. It also could be composed by a series of links or of small balls, threaded on band *d*, as is respectively indicated by fig. 9, 10, and 11, 12.

In the arrangement of the coupling described above, grooves
b of tube B are of triangular profile, with one side
580 perpendicular to the axis of the tube; they also may be given another triangular shape, as shows fig. 13, or they

even may be established by a series of gorges as shown by fig. 14.

Fig. 15 and 16 show a coupling arrangement in which the two tubes neither have male nor female part and are fitted with two similar parts, likewise entering one into the other. the deformable ring is divided into two halves which are adjusted, one of each, to the tubes; the schew-nuts are stationary and serve only for tightening and not to connect the two parts; each tube has a flange at its extremity, behind which is set the half-ring enclosed in an elastic band, the latter located behind the rim of the socket.

When inserting one part into the other, the half-rings move on under the pressure and fall back behind each one of the flanges of the half-tubes which they thereby retain; the tightening produced by the schewing of the two nut-screws compresses a compressible washer placed in the inside.

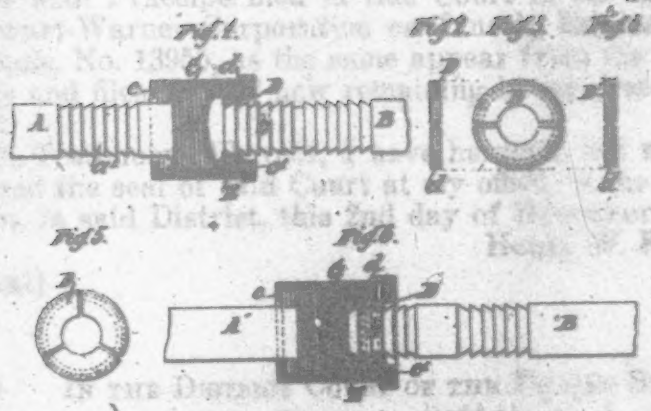
It must be understood that the coupling system above described according to the several methods of construction can be established in variations and detail modifications without altering the principal arrangements that have been exposed. These couplings can be employed for all kinds of tubes, rigid or flexible, and for all kinds of uses: water, gas, steam, etc.

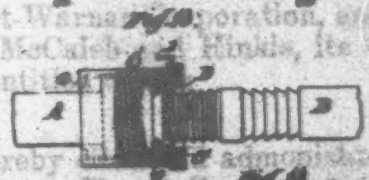
• • •

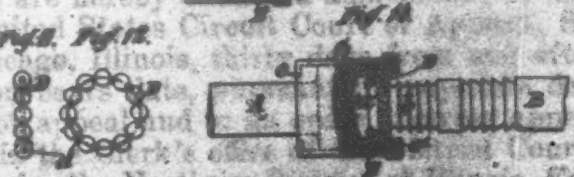
For Paul Pinel
Armengaud âîné.

U.S.D.C., N.D., ILL., E.D.
STEWART-WARNER CORP., PLF.
v.
LEVALLY, ET AL., DFTS.
EQUITY 13, 686
DFT. EXH. A-69
SHEETS SHEET 3

Nº 327,557 M. Pinel Pl. [illegible]







663 Northern District of Illinois
Eastern Division } ss.

I, Henry W. Freeman, Clerk of the District Court of the United States for the Northern District of Illinois, do hereby certify the above and foregoing to be a true and complete transcript of the proceedings had of record made in accordance with Praecipe filed in this Court in the cause entitled Stewart-Warner Corporation *vs.* Lincoln Engineering Co. of Illinois, No. 13955, as the same appear from the original records and files thereof now remaining in my custody and control.

In Testimony Whereof, I have hereunto set my hand and affixed the seal of said Court at my office, in the City of Chicago, in said District, this 2nd day of December, A. D. 1936.

Henry W. Freeman,
(Seal) *Clerk.*

664 In the District Court of the United States.
* * (Caption—13955) * *

CITATION.

The President of the United States, to the above-named plaintiff, Stewart-Warner Corporation, and to Messrs. Williams, Bradbury, McCaleb and Hinkle, its attorneys of record in the above-entitled cause:

Greetings:

You are hereby cited and admonished to be and appear in the United States Circuit Court of Appeals, Seventh Circuit, at Chicago, Illinois, thirty days from and after the day this citation bears date, pursuant to corporate defendant's petition for appeal and to an order allowing appeal filed and entered in the Clerk's office of the District Court of the United States for the Northern District of Illinois, Eastern Division, from the decrees and order referred to in defendant's petition for appeal filed in that certain suit, being in Equity No. 13,955, wherein you, Stewart-Warner Corporation, are plaintiff and appellee, and Lincoln Engineering Co., of Illinois is a defendant and is the appellant, to show cause, if any there

be, why the said decrees and the said order rendered
665 against the said defendant-appellant, as in said petition for appeal mentioned, should not be corrected, and why speedy justice should not be done to the parties on that behalf.

Witness the Honorable Walter C. Lindley, Judge of the District Court of the United States for the Northern District of Illinois, Eastern Division, this 26th day of October, 1936.

Walter C. Lindley,
United States District Judge.

Oct. 26th, 1936.

Service of the above citation and receipt of a copy thereof is hereby admitted this 26th day of October, 1936.

Stewart-Warner Corporation,
Williams, Bradbury, McCaleb & Hinkle,
By Lynn A. Williams,
Their Attorneys.

666 Endorsed: United States District Court. * * (Caption —13955) * *. Citation. Filed Oct. 26, 1936, Henry W. Freeman, Clerk. Delas G. Haynes, 818 Oliver Street, St. Louis.

Filed Dec. 5, 1936.

UNITED STATES CIRCUIT COURT OF APPEALS,

For the Seventh Circuit.

Lincoln Engineering Company,
Appellant,
vs.
Stewart-Warner Corporation,
Appellee.
} Appeal No. 6103.

STIPULATION.

It is stipulated by and between counsel for the respective parties as follows:

(1) That The Bassick Manufacturing Company was a corporation organized and existing under and by virtue of the laws of the State of Delaware, pursuant to certificate of incorporation filed in the office of the Secretary of State of Delaware on March 31, 1920.

(2) That by certificate of amendment filed in the office of the Secretary of State of Delaware on September 7, 1928, The

Bassick Manufacturing Company changed its corporate name to Alemite Manufacturing Corporation.

(3) That by certificate of amendment filed in the office of the Secretary of State of Delaware on May 13, 1929, Alemite Manufacturing Corporation changed its corporate name to Alemite Corporation.

(4) That Stewart-Warner Speedometer Corporation was a corporation organized and existing under and by virtue of the laws of the State of Virginia, pursuant to certificate of incorporation filed on December 20, 1912.

(5) That pursuant to certificate of amendment filed April 2, 1929, Stewart-Warner Speedometer Corporation changed its corporate name to Stewart-Warner Corporation.

(6) That on July 11, 1927, Clyde G. Butler, owner of United States Letters Patent No. 1,593,791, assigned unto The Cincinnati Ball Crank Company, an Ohio corporation, the whole right, title and interest in and to the said Letters Patent, together with all rights of action for infringement thereof.

(7) That on October 7, 1927, The Cincinnati Ball Crank Company assigned said Butler patent No. 1,593,791 to The Bassick Manufacturing Company, together with all rights of action for infringement thereof.

(8) That on December 30, 1933, Alemite Corporation assigned the whole right, title and interest in and to said Butler patent No. 1,593,791 to Stewart-Warner Corporation, together with all rights of action for infringement thereof.

The execution of this stipulation by the parties, and the filing and printing of the stipulation in the record on appeal, will make it unnecessary to print Items 1, 2, 3, 5, 6, and 7 of Plaintiff's Supplemental Praecipe for Record on Appeal in the appeal record in this case.

Lynn A. Williams
Williams Bradbury McCaleb & Hinkle
Solicitors and Counsel for Plaintiff.
Delos G. Haynes
Solicitors and Counsel for Lincoln Engineering Co. of Illinois.

Endorsed: Filed Dec. 5, 1936. Frederick G. Campbell, Clerk.

1 IN THE DISTRICT COURT OF THE UNITED STATES. Filed July 15, 1936.

For the Northern District of Illinois,

Eastern Division.

Stewart-Warner Corporation,
Plaintiff,
vs.
John R. LeVally and Frederick A. Faville, doing business as Lincoln Engineering Company of Illinois, and Lincoln Engineering Co. of Illinois,
Defendants.
} In Equity No. 13,955.

Lindley, District Judge.

Plaintiff, as assignee and owner of Patent No. 1,593,791 to Butler, applied for February 19, 1923 and allowed July 27, 1926, sues the Lincoln Engineering Company of Illinois, for contributory infringement of claim 2. The defenses are invalidity and non-infringement.

Claim 2* of the Butler patent describes a lubricating system for automobiles or other machines, essentially high pressure in character, in which each bearing is provided with a headed nipple for receiving oil or grease of a lubricant compressor having a coupling member for connecting said compressor with the nipples. The coupler is slipped easily and somewhat loosely over the nipple head. As the operator pushes on the compressor the pressure of the lubricant moves a piston within the cylinder in such a manner as to cause the locking or gripping jaws to clutch or grab about or
2 upon the nipple head. At the same time the grease under pressure acts also upon an apertured sealing seat, carried by the jaws and actuated by the piston in such a way

* Claim 2.—The combination with a headed nipple for receiving lubricant, of a lubricant compressor having a coupling member for connecting said compressor and nipple comprising a cylinder, a piston movable within the cylinder, and having an aperture for the discharge of lubricant thereof, an apertured sealing seat carried by said piston for engagement with the end of the nipple, connecting the piston aperture with a passage through the nipple radially movable locking elements carried by the cylinder coacting with the nipple and actuated by said piston for compressively clutching the elements upon the nipple whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said elements while the lubricant is passing through said connecting parts.

as to engage the end of the nipple and thereby produce a tight seal. Gripping, grabbing or clutching of the nipple is effected automatically, and engagement of the seal against the end of the nipple is achieved in the same manner. Both of these functions are effectuated by the pressure of the lubricant, without other manipulation of the coupler. Thus, the coupler and nipple are so constructed as to produce an essential relationship between the two functions and the mechanism for performing them. Yet each of the two functions is carried out completely and perfectly without interference by the other. As a result the operation is successful even though there be considerable variation in the precise dimensions in the forms and parts involved.

Upon analysis we find that the claim includes seven elements, namely: a headed nipple, a compressor or pump, a cylinder, a piston, an opening in the piston, a sealing seat and laterally or radially moving locking elements or jaws. Admittedly, each of these elements is old, and plaintiff makes no claim of invention because of the presence of any one of the particular elements but insists that invention resides in a new combination of old elements so associated, related and interrelated as to accomplish a new result.

The headed nipples are adapted to be screwed to each of the bearings of an automobile; the compressors are intended to be filled with grease and then to be coupled in succession to each of the nipples in order to inject grease into the opening of the several bearings. Consequently, the combination of the nipple, compressor and coupler is brought together only periodically and temporarily and in the hands of the owners or servicers of the car. The manufacturer buys the headed nipples and inserts them in the bearings. An automobile may require 25 to 60 such fittings. Some bear-
3 ings can be conveniently greased with a straight nipple; others with an elbow nipple, at angles varying from 90° to 22½°. Some of the nipples are long; others short, and they are screwed into holes tapped with different pipe thread sizes. Consequently, the manufacturer separately lists and prices each of the sizes of compressor which may be coupled to and used in conjunction with the nipples. Thus the purchaser may buy such nipple as he desires and a compressor of small capacity or one of large capacity or even a power driven compressor. An automobile owner may never use a compressor. He may have his car greased at a garage and in such case the combination occurs only when the car is greased.

In this respect the combination differs from that usually

found in industry. Ordinarily, a manufacturer makes and sells the complete combination, but in the business of high pressure lubricating equipment, the parts are necessarily sold separately. So, prior to the commencement of this suit, some six million Alemite Hydraulic guns or compressors claimed to have been embodied within the Butler patent were sold by plaintiff, and during the same period it distributed some 218,000,000 of its so-called Alemite Hydraulic System nipples.

For seven years prior to January, 1933, the Lincoln Engineering Company of St. Louis, Missouri, who is defending this suit, and who is treated herein as the real defendant, had manufactured grease guns for plaintiff. The latter took all of its product. Stewart-Warner had furnished couplers and nozzles to Lincoln, and the latter had incorporated them in compressors, which it in turn sold to Stewart-Warner. These compressors and nozzles were used in combination with hundreds of millions of Gullborg pin fittings and Zerk push type fittings manufactured and sold by plaintiff.

4 Early in 1933 the Lincoln Company decided to undertake the direct sale of its compressors to service stations and garages and took steps to create a distributing organization for such purpose. Prior to that time, for many years, practically all American-made automobiles had been equipped at their factories with pin fittings sold and manufactured by plaintiff under Gullberg or with push type fittings, manufactured and sold by plaintiff under Zerk. Hundreds of millions of these nipples were in the field, practically to the exclusion of anything else adapted to lubrication of automobile bearings. Consequently, the Lincoln Company, in order to sell its compressors, found it necessary to incorporate a terminal of such character as would connect with and cooperate satisfactorily with these Gullberg and Zerk nipples. As a result it brought out its N-1 needle type nozzles.

In April, 1933, plaintiff through its subsidiaries the Alemite Corporation, put upon the market its new Alemite Hydraulic system involving the combination now relied upon. Soon thereafter the Lincoln Company, in its advertising, claimed that its compressors could be used not only with Gullborg fittings and Zerk push type nozzles but also with the headed nipple of the Alemite Corporation which plaintiff claims is protected by the Butler combination patent.

In July, 1934, Lincoln's advertising literature illustrated all three types of fittings as the various kinds of nipples with which the Lincoln compressor and nozzle were intended to be

combined and used. Thus far, however, the Lincoln Company had not manufactured or sold any nipples of any kind for use in the lubrication of automobiles. But in the summer or early fall of 1934, after the Alemite system had been on the market for one and a half years, Lincoln entered upon negotiations with General Motors Corporation to sell to it in lieu of Alemite Hydraulic fittings, theretofore manufactured and
5 sold to it by plaintiff, a new fitting to be manufactured for the first time by Lincoln. The negotiators had under discussion round headed and straight-sided nipples, without head, shoulder, or peripherial grooves, not adapted for cooperation with the gripping jaws of the Alemite Hydraulic coupler, but properly adapted for use in conjunction with the Lincoln N-1 nozzle and Lincoln Snap-On Coupler.

No straight-sided nipples, other than a few samples, were manufactured or sold. On the other hand, Lincoln began to manufacture a peripherally grooved, shouldered and headed nipple of form, size and dimensions as to afford perfect cooperation with the gripping jaws of the Alemite Hydraulic coupler. The first of these nipples were shipped to the Oldsmobile factory on November 24, 1934 and displaced the purchase and use of the Alemite fitting. Shortly thereafter Cadillac, Buick and Pontiac switched from the peripherally grooved and headed nipples of plaintiff to those of Lincoln. These branches of General Motors, however, except as to cars sold in foreign countries, included no purchase of couplers.

For eighteen months plaintiff had attempted to put its new coupler into the hands of every garage and service station in the United States. On April 1, 1933, 2,385,148 such couplers had been sold. It appears clearly that the sale of Lincoln Kleenseal fittings dates from the shipment made to Oldsmobile and that the fitting satisfactorily serves with plaintiff's compressor. Thus, the purchasers of automobiles from General Motors divisions could have their cars, equipped with Kleenseal fittings, greased with the Alemite Hydraulic compressors and couplers then in the hands of the service stations and garages through the country.

Mr. Fox, an engineer for Lincoln, became familiar with plaintiff's headed nipple shortly after its first appearance on the market in April, 1933. The automobile trade papers were, in that spring, summer and fall, replete with ad-
6 vertisements and reading notices illustrating and describing every detail of plaintiff's hydraulic coupler, and Lincoln in July, 1934, illustrated in its circulars, Alemite headed nipples as being capable of combination with the Lincoln

compressor. It is only a fair inference that during all of this period Lincoln, which seems to have been alert in its business, knew about and understood the Alemite compressor. At any rate, Mr. Fox admits that he became familiar with the coupler in January, 1935, and from that time on, Lincoln sold its peripherally grooved, shouldered and headed nipples, adapted for satisfactory cooperation with the Alemite Hydraulic compressor, with the knowledge that the purchasers of the Lincoln nipples could use them and would use them in conjunction and combination with the Alemite compressors and couplers. Furthermore that company became familiar with the Alemite fittings immediately upon their appearance in April, 1933, and when the Lincoln nipples were first put on the market in November, 1934, they were in some thirty odd styles having arbitrary dimensions corresponding with those of the Alemite headed nipples and having their structure of such size, form and dimensions as to make them completely interchangeable with Alemite nipples.

On April 17, 1935, a representative of plaintiff went to the place of business of Lincoln in Chicago and said to the man behind the counter that he wanted to purchase some nipples to be used with a gun which he then produced, an Alemite Hydraulic compressor and coupler. The man produced Lincoln fittings. The witness tried them in cooperation with the gun and found that they cooperated with the Alemite compressor and coupler; purchased the fittings and took them away with him. He subsequently made other purchases of similar fittings for the same purpose. It thus appears in evidence that Lincoln sold the fittings upon the express understanding that they were to be used in combination
7 with plaintiff's compressor then exhibited to the salesman. At all times thereafter Lincoln sold its peripherally grooved, headed and shouldered fittings in commercial displacement of plaintiff's fittings with the knowledge and understanding that the Lincoln nipples thus sold could be used and would be used by the purchaser in conjunction with plaintiff's compressor and coupler part of the complete combination under the Butler patent.

This bring us, then, to the issue in this case; that of contributory infringement. If the combination of the Lincoln nipples with the plaintiff's hydraulic compressor and coupler embodies Claim 2 of the Butler patent in suit and that claim is valid, then we have a clearer case of contributory infringement.

The testimony shows a complete response of the combination of the Lincoln fittings and plaintiff's Alemite Hydraulic compressor and coupler to Claim 2 of the Butler patent. Every element included in Claim 2 is included in such combination, and the demonstrations disclose that the cooperation and the functions thereof in this combination are the same as the combination of the plaintiff's compressor, coupler and fittings.

But defendant insists that claim is invalid. It relies largely upon the case of *Stewart-Warner* v. *Jiffy,* 81 F. (2d) 786 (CCAB). There the court held Claim 1 of the Butler patent, while valid, not infringed by the Jiffy Company's sale of a certain coupler intended for use in conjunction with the cylindrically projecting end of an Alemite pin fitting. Claim 1 is not involved in this case. It included a fitting in the combination, and the claim is similar to claim 2 but the nipple is not headed. In the Jiffy case the nipple considered did not have head, throat or shoulders. It was a perfectly smooth straight cylinder, and the Circuit Court of Appeals was of the opinion that the gripping action of the segmental jaws as disclosed in the Butler patent would not be sufficiently powerful to hold the coupler to such a plain, cylindrical nipple under the force of grease under pressure of several thou-
8 sand pounds per square inch. The Court said:

"But when we turn to the Butler patent specifications disclosing the 'means' he had in mind for 'compressively engaging about the nipple for locking said parts together,' we find no reference to any elements corresponding to such positive wedging means as above described. He described a nipple having a head, a throat and a shoulder and segments adapted to slip over the head of such a nipple and embrace the throat thereof. Then he specifies spring fingers mounted on the forward face of the piston. Ample room is left in the cylinder for the free play of the spring fingers. As the piston is moved forward by the pressure of the lubricant the spring fingers do engage and press upon the segments so that the segments are pressed upon the throat of the nipple. But the nipple is not specified to be held against longitudinal displacement by the force of the gripping. The language of the specifications is that the segments are held in position on the throat by the spring fingers, but it is the 'shoulder' on the nipple which 'prevents the retraction of the segments' or pulling away from the nipple. We conclude from consideration of all the specifications and the drawing that the inventor excluded disclosure of elements which would be actuated by

the forward movement of the piston to lock the coupler to the nipple by any unyielding wedging action but that he disclosed only such a yielding compression as should be accomplished by spring fingers.

"We find the difference between the Butler patent and the Jiffy coupler substantial in that the mechanical or engineering principle on which the Butler patent compresses the jaws of its chuck about the bearing nipple is different from that relied upon in the Jiffy structure. As they are not mechanical equivalents and as it does not appear that Butler invented or disclosed such a chuck as that made by Jiffy, there was no infringement."

Consequently, the opinion is of no aid in the decision of this case. Here we are dealing with a nipple of the character described by Butler in Claim 2, with a head, a throat and a shoulder. The coupler incorporation segments adapted to slip over the head of such a nipple and embrace or grasp the throat thereof. It is the shoulder on the nipple which prevents the retraction of the segments. The nipple discussed in the Jiffy case, as the court pointed out, was not of such
9 construction. It would not prevent longitudinal displacement by the force of the gripping of a compressor of Butler's type, although it would cooperate with the Jiffy compressor held not to infringe. It did not have the shoulder which prevents retraction of the segments or the pulling away from the nipple. Lincoln sells a headed nipple, to be substituted for the plaintiff's headed nipple. It has a head, a throat and shoulders, and when used in conjunction with the Alemite Hydraulic coupler, the segments of the coupler slip over the head of the defendant's nipple and embrace the throat thereof and clutch the head within the meaning of Butler's specifications and claims.

Defendant insists that this case is controlled by the recent decisions of the Supreme Court in *The Bassick Manufacturing Company* v. *The R. M. Hollingshead Company, G. S. Rogers, et al.*, v. *Alemite Corporation*, ... U. S. ....., 80 L. Ed. 782, and it becomes necessary to examine those decisions with some care.

These cases went to the Supreme Court after the Gullborg patent was about to expire. The question of validity of the patents involved had been raised in many district courts and the patents held valid and infringed in various Circuit Courts of Appeals. Unfortunately the record was rather short. Plaintiff in the Hollingshead case offered in evidence a sam-

ple of defendant's device and relied upon physical demonstration to show that uncoupling involved the suction effect of Gullborg.

From a decree finding infringement in the sale of the compressor and coupler of the type complained of, the Hollingshead Company appealed and argued that the device complained of had no suction effect. The Court of Appeals affirmed, 73 Fed. (2d) 545 (CCA6). The Supreme Court took jurisdiction, and the question presented was as to the validity of the Gullborg patent and whether the device complained of utilized the suction effect of the Gullborg claims. The Supreme Court held the claims valid but said that the suction effect construction had not been proved and that the accused device did not involve the novel feature claimed in the patent. Clearly the case was determined upon a question of fact and the decision is of no help here except in so far as it implies that if the device had been shown to be of the suction effect type, its manufacture and sale would have been held to constitute contributory infringement.

The language of the opinion indicates no intention to upset or to reverse anything that had been previously announced as to the character of a combination patent. Such an invention is defined by Mr. Justice McKenna in *Leeds & Catlin* v. *Victor*, 213 U. S. 325 at 332 as follows:

"A combination is a composition of elements, some of which may be old and others new, or all old or all new. It is, however, the combination that is the invention, and is as much a unit in contemplation of law as a single or noncomposite instrument. Whoever uses it without permission is an infringer of it. Whoever contributes to such use is an infringer of it. It may be well here to get rid of a misleading consideration. It can make no difference as to the infringement or noninfringement of a combination that one of its elements or all of its elements are unpatented."

In the companion case of *Leeds & Catlin* v. *Victor*, 213 U. S. 501, he said:

"A combination is a union of elements, which may be partly old and partly new, or wholly old or wholly new. But, whether new or old, the combination is a means—an invention—distinct from them. They, if new, may be inventions and the proper subjects of patents, or they may be covered by claims in the same patent with the combination.

"But whether put in the same patent with the combination or made the subjects of separate patents, they are not identical with the combination. To become that they must be united

under the same cooperative law. Certainly, one element is not the combination, nor, in any proper sense, can it be regarded as a substantive part of the invention represented by the combination, and it can make no difference whether the element was always free or becomes free by the expiration of a prior patent, foreign or domestic. In making a combination, an inventor has the whole field of mechanics to draw from.

This view is in accordance with the principles of the
11 patent laws. It is in accordance with the policy of Sec. 4887 of the Revised Statutes, which is urged against it." (p. 318)

I find nothing in the Hollingshead case that purports in any way to disturb the previous announcements of the Supreme Court. Rather, it seems to me, the court reaffirms its adherence to its former holding.

It is well to observe that there are three classes of combination patents as follows:

(1) One or more old elements, plus one or more new elements.

(2) A plurality of elements, all of which are old.

(3) A plurality of elements, all of which are new.

Obviously to any trial judge, in their final analyses, almost all patentable combinations are of the second class, namely: those in which all of the elements are of themselves old. The old elements in a new valid combination, as the Supreme Court says, constitute invention and are as much a unit in contemplation of the law as a single or non-composite instrument. There is no one element that can be said to be the gist of the combination, but it is the cooperative, coordinating, unified result, wherein the various elements contribute to one unitary result, which constitutes invention. It is misleading, therefore, to speak of any one element as the essence of the invention. Thus, in *Automotive Parts Co.* v. *Wisconsin Axle Co.*, 81 Fed. (2d) 125 at 126 (CCA6), the court said:

"The invention is for a composite thing, embracing severed elements or parts, all of which are necessary to and cooperate in the operation of the patented unit. We cannot subscribe to the view that the test of contributory infringement in the furnishing of parts for a combination invention is whether the parts furnished constitute the gist or essence of the invention; indeed, we cannot see how it may be said that any one element or another marks the advance step or is the essence of such an invention. There are cases, it is true, in
12 which the phrase 'essence of the invention' is used, but in our view, when the facts in those cases are considered,

it cannot be said that the conclusions reached were the result of a logical selection of one or more elements of the combination as the gist or essence of the invention."

And the Supreme Court said in *Leeds & Catlin* v. *Victor*, 213 U. S. 301:

"Certainly, one element is not the combination, nor, in any proper sense, can it be regarded as a substantive part of the invention represented by the combination."

The word "substantive" means "an essential part" or "constituent" or "relating to what is essential."

The question, of course, always, is whether there is a new patentable combination which produces a new and unitary result. The operation and functioning of all of the old elements of the new combination must be affected by their presence in the new combination and each part must contribute its part to the unitary whole. Otherwise, we have an unpatentable aggregation. But if the operation or functioning of each of the old elements is in some way affected by its presence in the new combination in such a way as to contribute to the accomplishment of a new and unitary result, then we have a valid patent claim.

In the Rogers case, apparently, in the district court the trial revolved about the question of whether the defendant sold its products with the knowledge that they would be used in conjunction with the parts sold by plaintiff. But in the Supreme Court this question of fact was abandoned and the defendant's contentions were that Gullborg patent was invalid, and that the plaintiff was illegally extending its monopoly. The court held that the plaintiff might not extend the monopoly of its patent. But we do not understand that the decision in any way sought to review any prior announcement of the Supreme Court upon the subject of contributory infringement. The court did not so expressly hold, and I find in the opinion no such implication.

13 However, the court held that the evidence was that the prior art embraced the use in combination of a grease gun composed of a chamber or pump, a hose, a hose-coupler, and a spring-closed fitting, the coupling being of the pin and slot or bayonet type. This prior art arose from Gullborg's earlier patent No. 1,307,733 and the Seng French patent No. 468,869. The court observed that the plaintiff's position was that when defendant furnished a gun, a part of this old unpatented and unpatentable combination, for use with the pin fitting of Gullborg No. 1,307,733, it contributorily infringed claims 14 and 15 of the patent in suit, because those claims

describe the combination of any grease gun with the patented pin fittings. For the invention of his fitting, Gullborg had previously applied for and obtained a patent, No. 1,307,733 not then in suit. Claim 15 of the Gullborg patent then in suit described a combination consisting of the pin fitting of Gullborg's patent No. 1,307,733, with any grease pump having a bayonet type coupler. The court said that the question then was whether claims 14 and 15, unless restricted to the combination of a grease gun and coupler and a pin fitting such as are described in the specifications of the patent, are void as attempting to extend Gullborg patent No. 1,307,733 to the use therewith of any grease gun not having the suction device of the patent in suit. It held that though claims 14 and 15 are for a combination using a device of a prior patent, with grease gun or coupler of any type, they must be read as claiming only a combination of pin fittings and a gun, with coupling device having the suction effect set forth in Gullborg's patent; otherwise the claims would be void as unlawful attempts to extend the monopoly of the pin fitting in patent 1,307,733.

The court observes that Rogers neither made nor sold pin fittings of the type covered by Gullborg No. 1,307,733 and
14 observed that the question was whether the patentee might further claim the combination between the patented pin fitting and any form of grease gun. He would thereby in effect be repatenting the old combination by reclaiming it with the improved element substituted for the old element. This the court said could not be done.

The thought underlying the court's remarks was that except for the suction-effect coupler combination, Gullborg had made but one invention, namely: his particular form of pin fitting; that his right to patent protection had been exhausted in his patent 1,307,733 and that he could not be permitted to extend the monopoly of this old patent. The court, in effect, reaffirmed *Leeds & Catlin* v. *Victor Talking Machine Co.*, 213 U. S. 301, 325.

The rather startling features of the Supreme Court's opinion is the announcement that the Leeds case, patent to Berliner No. 534,543 was a pioneer patent. I consider this unimportant, because evidently the Supreme Court has extended, intentionally or otherwise, the meaning of the word "pioneer," for in the Leeds case the two earlier patents 372,786 and 382,790 described and claimed substantially everything in Berliner, 534,543, then being considered, in the way of disc, record, cabinet and record in phonograph machines. There

was an improvement, however, which I shall later discuss. As a matter of fact, the original phonograph goes back to Edison's patent in 1878. Many other delvers in the art have procured patents since then, but Bell and Tainter No. 341,214 includes most of the prior art. As compared with that, the Berliner invention consisted in permitting the stylus of the reproducer to be propelled by and along the sound groove of the record tablet all the way from its outer circumference to its inner end. To accomplish this, it made use of
15 a mounting for the reproducer which would permit it to travel freely throughout this distance. Berliner's invention resided in giving the reproducer a greater degree of freedom of movement to follow the groove in the record, and by doing so, eliminating the necessity of providing means for relatively shifting the record and reproducer. The new thing was the unrestricted pivotal mounting. This was pointed out by Judge Hazel in the trial court (140 Fed. 860) and by Judge Hough in the Court of Appeals in 154 Fed. 58. Consequently, the statement of the Supreme Court in the Leeds case that the patent was a pioneer must be taken into consideration with the record disclosing its place in the history of the art.

In *Leeds & Catlin* v. *Victor,* 213 U. S. 311, the court had to do with a combination consisting of the elements (1) a traveling disc having a sound record formed thereon; (2) a reproducing stylus, shaped for engagement with the record, and free to be vibrated and propelled by it. It was, therefore, a true mechanical combination device, producing by the cooperation of its constituents the result specified in the manner specified. The Leeds records were equally suitable for use in connection with the Victor machine as well as their own machines. The court held that there was contributory infringement.

The result was in general the old result of producing or reproducing articulate sounds. But the new and unitary result was the production of articulate sounds by the automatic swing of the stylus across the disc record; in this respect only the patent was a pioneer. Everything else was old. The new thing was the pivot or hinge for the stylus so that it might be propelled by the record all the way across the face of the record. The various elements possessed no utility without cooperation in combination. Each element was necessary to the operation of the whole.

16 From an examination of the Leeds opinion I believe that the basis of the decision relative to the Gullborg patent was that this inventor of pin fitting, part of the com-

plete combination, part of which had already been separately patented, did not bring about any new mode of operation or cooperation in or among the other elements thereof. It did not alter or modify or give new functions to any of the other parts of the combination; and, therefore, the old parts did not participate in a new way in the accomplishment of a new and unitary result. As pointed out by Judge Thacher in the district court in *Bassick* v. *Adams*, 39 Fed. (2d) 904, in discussing the Gullborg patent where he says:

"The novelty in Gullborg's fitting was merely in the use of the same pin to furnish bearings for the slot and an abutment for the spring, and it was only this specific form of construction which was patentable. *Lyman Mfg. Co.* v. *Bassick Mfg. Co.* (CCA) 18 F. (2d) 29. Thus it will be seen that there was no functional novelty in combining such a pin fitting with a bayonet coupler and a grease gun. The old combination of the gun, the bayonet coupler, and a pin fitting with ball and spring valve would work as well and accomplish precisely the same result. To extend the combination claims to cover the use of any old gun and any old coupler on a Gullborg fitting is clearly not permissible in view of the prior art, which limits novelty in the pin fitting to a specific form of construction and deprives the aggregation of elements of all patentable novelty as a combination. Whether its elements be old or new, a combination is an invention distinct from them."

The ground for decision appearing in these opinions is not applicable to the Butler patent, Claim 2. Here the question is whether Butler produced a combination which achieved a new and unitary result by the cooperation of all the elements, whether all the elements have new or modified functions as a result of changes or substitutions or whether the old elements have only the old functions operating and cooperating in the old way to produce only an old result.

17 We have seen that the combination consists of seven elements, all of which are old; that invention arises not from any one element but from the new unitary result. Defendant insists that the essence of the combination is the coupler, but we have seen this is a fallacious theory, for if it were correct and available to excuse the use of the nipple to cooperate in the combination, one person might make the nipple, another, the cylinder; another a group of jaws, another the sealing seat; another the piston. Each of these are old; each of them sell separately. The purchaser could quickly assemble them and then claims that each part had an inde-

pendent status apart from that in the Butler combination. There could then be no infringement.

The headed nipple, which cooperates with the sealing seat and jaws of the coupler and thus with the piston and cylinder, is just as essential a part of the Butler invention as any of the several elements of the coupler. There is cooperation between the nipple and the jaws which produces the operation of the seal, which in turn effectuates the operation of the gripping jaws, making possible heretofore unachieved pressures. The headed nipple has new functions arising out of direct cooperation with the jaws. The head spreads the jaws of the coupler when the latter is attached and thus prepares the coupler for operation in bringing about a mechanically strong and lubricant tight joint. In detaching the coupler the head of the nipple engages and pushes the jaws outwardly. These in turn push the piston backward, thereby effecting the release of the coupler from the nipple. The presence and the action of the nipple are essential, because the nipple alone makes it possible to build up in the cylinder of the coupler a grease pressure which will force the jaws into gripping enforcement with the nipple. The nipple is not merely a receptacle. It becomes an element which coacts to influence
18 and make possible the desired operation of the coupler mechanism.

Butler was the first to utilize a headed nipple and a compressor as cooperating elements of a combination whereby a grease tight and mechanically strong connection between compressor and bearing were effected automatically in and by the grease pumping operation of the compressor alone.

The high pressure delivery of grease from the compressor to the interior of the bearing, due to the strong and grease-tight attachment of the grease gun to the grease passageway of the bearing, was a new, useful and unitary result. It could not be accomplished with anything less than the combination of all of the elements included in Butler. Each part of the combination performed new functions and operated and cooperated in new ways in order to accomplish the single new result. The invention of Butler resides in the combination and not in one specific element. Every one of the seven old elements' functions became essential factors in the new combination. The situation is not one where the language of the Supreme Court in the Gullborg case is applicable, for in the sense that the Supreme Court used the term pioneer, Butler is equally a pioneer. A completely new unitary result is achieved,—something never accomplished be-

fore. Just as the Supreme Court said of the Berliner patent, "every element is necessary to the operation of the other."

What has been said with reference to the Hollingshead and Rogers cases is equally applicable to the recent decision of Judge Schoonmaker in Stewart-Warner *vs.* Rogers #2983 and Stewart-Warner *vs.* Universal Lubricating System, Inc., #3041 in the District Court for the Western District of Pennsylvania, unreported.

Defendant insists that the history of file wrapper is fatal to Butler's claim in view of the fact that the third claim was cancelled and that the present claim construed as contended by plaintiff is equivalent to the rejected claim. I do not believe such result follows, for the plaintiff is not asking to have claim 2 interpreted or construed in such way as to include the mechanism of cancelled claim 3. There is no estoppel as contended.

19

Defendant argues that to decree this combination valid is to deprive prior patentees of valid old elements included in the combination of their rights and to limit them and their uses. But we believe that the complaint is not well founded. Defendant is free to make and use the old articles for use in the old manner taught by the prior art, but when these old elements are included in the new combination, achieving a new and unitary result, we may not deny validity—

"then, indeed, the protection which is promised by the constitution and laws of the United States to inventors is a poorsham. Many of the most valuable patents are combinations of nonpatentable elements, and the only effective mode of preventing infringement is by suits against those who, by furnishing the parts which distinguish the combination, make it possible for others to assemble and use the combination, and who, by advertisement of the sale of such parts and otherwise, intentionally solicit and promote such invasions of the patentee's rights." *Thomson-Houston* v. *Ohio Brass,* 80 Fed. 712, 721 (CCA6) Opinion by Judge Taft.

Defendant argues at length that the sealing mechanism of Butler is not in combination with the gripping mechanism but constitutes mere aggregation. It is to be observed, however, that the operation of the gripping mechanism is absolutely dependent upon the operation of the sealing mechanism and that the operation of the latter is dependent upon the operation of the former. Each is dependent upon the other. Functioning in cooperation and coordination is necessary to produce the desired result. This is not aggregation.

A great deal of attention has been given to the argument that the Butler invention must be limited to a flimsy spring finger between the piston and the jaws of the coupler. Irrespective of the decision of the Circuit Court of Appeals for the Eight Circuit, the record of which is not before us, it is sufficient to say that the evidence here presented discloses clearly that the operability of the Butler invention was not dependent upon any particular degree of springiness; that the device will operate satisfactorily to accomplish all the results described by Butler, if the piston is rigid or very springy or only slightly so. Furthermore there is nothing in the claim of the Butler invention which does not apply to the rigid assembly of Butler's original device, in evidence, in the same manner as it applies to the flexible sample made and produced by defendant. Butler in no place makes any claim which recognizes as essential this factor. I cannot read into Claim 2 any requirement of springiness or spring fingers.

20

Defendant cites certain prior art. Newton patent No. 1,118,876 discloses a device for use in testing under pressures of one hundred or one hundred fifty pounds per square inch the air brake hose couplings of cars in railroad trains. It includes no headed nipple, lubricant compressor, aperture for discharging grease, apertured sealing seat carried by a piston for engagement with the nipple and nothing whereby the pressure of the lubricant on the piston will move the said element to compress forcibly while the lubricant is passing through the connecting parts. It teaches nothing of what Butler achieved. The modified structure produced by the defendant I believe does not follow the teaching of Newton. It is impractical for Newton's purposes, and does not teach what Butler taught.

Defendant insists that Lincoln cannot contributorily infringe the Butler patent because plaintiff's coupler part is not constructed according to the Butler patent, and Claim 2 does not properly cover plaintiff's hydraulic apparatus. I believe the premises are not well founded but that plaintiff's construction follows the teaching of Claim 2.

21

Defendant contends that non-use of Butler device for sometime renders the patent therefor subject to a strict construction and that it should be construed so that it will not be infringed by Kleenseal fittings. It seems that Butler did not manufacture under his patent for two or three years, but immediately upon the purchase of the patent, plaintiff began to manufacture under the same and put its product into

the widest possible commercial use, and such use has grown to the extent that the combination is used on ninety-nine per cent of the automobiles made and sold in America. This success had been attained a year prior to the commencement of manufacture and sale of the nipple of defendant. There is no legal reason why, when commercial success has resulted and a late infringer seeks to defend, he should be allowed to say that the patent is limited in some way because in the first two or three years of its life no manufacture took place. There is estoppel where defendant did not begin its manufacture until after commercial success had been achieved by the new owner of the patent.

Defendant contends that its nipples may be used in association with compressors and nozzles other than those of the Butler patent. To my mind this is an unimportant fact. The round headed and straight-sided nipple which defendant first designed could be used with all of these other compressors but could not be used with devices built in accord with Butler. When defendant changed from a non-infringing device which it could use with other nozzles, to infringing devices which could be used and were intended to be used in combination with plaintiff's couplers, it began its infringement.

As Walker on Patents (6th ed.) p. 554 said:

22 "But where the machine or other property thus furnished, is useful for some other purpose than to be a part of a patented combination, or to make a patented article, or to be operated upon by a patented machine, or to be used in performing a patented process, and where he who furnishes the property, does not intend or know, when furnishing the same, that it is to be thus used, he incurs no liability to an action for infringement.

But if he knew or intended that the property furnished by him was to be used in either of the infringing ways, he cannot defeat an action for infringement, by showing that the furnished property could have been used in some non-infringing way.

In the absence of specific proof of knowledge or intent, the fact that the property furnished could be used with an article or machine which in itself could not be an infringement and that there are many such articles or machines in use is sufficient to absolve one who supplies such property from the charge of infringement."

I conclude, therefore, that Claim 2 is a valid patentable combination; that the defendant's fittings sold, with the knowledge and understanding that the same were to be used

in cooperation with the Alemite compressor, are a contributory infringement and that there is nothing in defendant's contentions to avert the resulting consequences.

The findings of fact and conclusions of law incorporated herein will be included in any formal findings and conclusions adopted this date.

Entered this 15th day of July, A. D. 1936.

Walter C. Lindley,
Judge.

23 Northern District of Illinois, } ss.
Eastern Division. }

I, Henry W. Freeman, Clerk of the District Court of the United States for the Northern District of Illinois, do hereby certify the above and foregoing to be a true Copy of Opinion of Judge Lindley, inadvertently omitted from Transcript of the proceedings had of record made in accordance with Praecipe filed in this Court in the cause entitled Stewart-Warner Corporation *vs.* Lincoln Engineering Co. of Illinois, No. 13,955 as the same appear from the original records and files thereof now remaining in my custody and control.

In Testimony Whereof, I have hereunto set my hand and affixed the seal of said Court at my office, in the City of Chicago, in said District, this 18th day of February, A. D. 1937.

Henry M. Freeman,
(Seal) *Clerk.*

24 (Endorsed) Filed Feb 18 1937 Frederick G. Campbell, Clerk.

UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

I, Frederick G. Campbell, Clerk of the United States Circuit Court of Appeals for the Seventh Circuit, do hereby certify that the foregoing printed pages, numbered from 1 to 620, inclusive, contain a true copy of the printed record, printed under my supervision and filed on January 21, 1937, on which the following entitled cause was heard and determined:

Lincoln Engineering Company of Illinois,
Appellant,

vs.

Stewart-Warner Corporation,
Appellee,

No. 6103, October Term, 1936, as the same remains upon the files and records of the United States Circuit Court of Appeals for the Seventh Circuit.

In Testimony Whereof I hereunto subscribe my name and affix the seal of said United States Circuit Court of Appeals for the Seventh Circuit, at the City of Chicago, this 30th day of September, A. D. 1937.

Frederick G. Campbell,
(Seal) *Clerk of the United States Circuit Court of Appeals for the Seventh Circuit.*

At the October Term of The United States Circuit Court of Appeals for the Seventh Circuit, begun and held in the United States Court House in the City of Chicago on the Sixth Day of October, in the Year of Our Lord One Thousand Nine Hundred and Thirty-Six, and of our Independence the One Hundred and Sixty-First.

Lincoln Engineering Company of Illinois,
Appellant,
6103 *vs.*
Stewart-Warner Corporation,
Appellee.

Appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division.

And on, to wit, the 5th day of December, 1936, there was filed in the office of the Clerk of this Court a stipulation re printing record, which said stipulation is not copied here as the same appears on Pages 600 and 601 of the printed record in this cause certified herewith under separate cover.

And afterwards on, to wit, the 10th day of December, 1936, there was filed in the office of the Clerk of this Court the appearance of counsel for appellant, which said appearance is in the words and figures following:

UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

No. 6103. October Term, 1936.

Lincoln Engineering Co. of Illinois,
Appellant,

vs.

Stewart-Warner Corporation,
Appellee.

The Clerk will enter our appearance as counsel for the appellant.

Leonard L. Kalish,
Land Title Bldg.,
Philadelphia, Pa.
Delos G. Haynes,
818 Olive Street,
St. Louis, Mo.

Endorsed: Filed Dec. 10, 1936. Frederick G. Campbell, Clerk.

And on the same day, to wit, the 10th day of December, 1936, there was filed in the office of the Clerk of this Court the appearance of counsel for appellant, which said appearance is in the words and figures following:

UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

No. 6103. October Term, 1936.

Lincoln Engineering Co. of Illinois,
Appellant,

vs.

Stewart-Warner Corporation,
Appellee.

The Clerk will enter my appearance as local counsel for the appellant.

Milton T. Miller,
1604—38 So. Dearborn St.,
Chicago.

Endorsed: Filed Dec. 10, 1936. Frederick G. Campbell, Clerk.

And afterwards on, to wit, the 14th day of December, 1936, there was filed in the office of the Clerk of this Court the appearance of counsel for appellant, which said appearance is in the words and figures following:

IN THE UNITED STATES CIRCUIT COURT OF APPEALS
For the Seventh Circuit.

Lincoln Engineering Company of Illinois, *Defendant-Appellant,* *vs.* Stewart-Warner Corporation, *Plaintiff-Appellee.*	Appeal No. 6103.

APPEARANCE.

The Clerk will please enter my appearance as counsel for appellant.

Lloyd R. Koenig,
818 Olive St.,
St. Louis, Missouri.

Endorsed: Filed Dec. 14, 1936. Frederick G. Campbell, Clerk.

And afterwards on, to wit, the 19th day of December, 1936, there was filed in the office of the Clerk of this Court the appearance of counsel for appellee, which said appearance is in the words and figures following:

UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

No. 6103. October Term, 1936.

Lincoln Engineering Company

vs.

Stewart-Warner Corporation

The Clerk will enter my appearance as counsel for the appellee.

Lynn A. Williams,
2300 Board of Trade Bldg.,
Chicago, Ill.

Endorsed: Filed Dec. 19, 1936. Frederick G. Campbell, Clerk.

And afterwards on, to wit, the 18th day of February, 1937, there was filed in the office of the Clerk of this Court an opinion by Lindley, D. J., which said opinion is not copied here as the same appears on Pages 603 to 620 of the printed record in this cause, certified herewith under separate certificate.

And afterwards on, to wit, the 17th day of May, 1937, the following further proceedings were had and entered of record:

Monday, May 17, 1937.

Before:

Hon. Evan A. Evans, Circuit Judge.
Hon. William M. Sparks, Circuit Judge.
Hon. J. Earl Major, Circuit Judge.

Lincoln Engineering Company of Illinois *vs.* Stewart-Warner Corporation	Appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division.

6103

Now this day come the parties by their counsel, and this cause comes on to be heard on the printed record and briefs of counsel, and on oral argument by Mr. Leonard L. Kalish, counsel for appellant, and by Mr. Lynn A. Williams, counsel for appellee, and the Court having heard the same takes this matter under advisement.

And afterwards on, to wit, the 29th day of June, 1937, there was filed in the office of the Clerk of this Court the opinion of the Court, which said opinion is in the words and figures following:

IN THE UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

No. 6103. October Term, 1936, April Session, 1937.

LINCOLN ENGINEERING COMPANY OF ILLINOIS, *Appellant,*
vs.
STEWART-WARNER CORPORATION, *Appellee.*

Appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division.

June 29, 1937.

Before EVANS, SPARKS, and MAJOR, *Circuit Judges.*

EVANS, *Circuit Judge.* Appellee is the owner of the Butler Patent, No. 1,593,791. Appellant is the distributor of the Lincoln Engineering Company of St. Louis, Missouri, which is conducting and controlling the defense to this litigation. It is charged with infringing the Butler Patent. The trial was a long one, and the District Court prepared his own findings and conclusions which fully covered the nature of the invention, the claims, the defenses, the state of the art, as well as other material issues. These findings favored the appellee.

Accompanying the findings was an opinion which set forth the reasons for the conclusions which the court reached. About three months later, upon a petition for rehearing filed by appellant, the court filed a second opinion, which may be found in 16 F. Supp. 778. Three weeks later the court filed a third opinion which dealt with questions raised by appellant. The third opinion appears in 31 U. S. P. Q. 195. Reference is made to the places where these opinions appear because it will, we think, justify a more abbreviated statement of the facts. Different conclusions respecting the same claim (No. 2) of this patent, so appellant asserts, were reached by other Federal courts. *Stewart-Warner Corporation* v. *Jiffy*

Lubricator Co., 81 F. (2d) 786; *Stewart-Warner Corporation* v. *Rogers*, 15 F. Supp. 410.

The decree subsequently entered granted an injunction that restrained future infringements of the patent and directed an accounting of profits and damages occasioned by past infringements.

The application for the Butler patent was filed February, 1923, and the patent issued July 27, 1926. It related to Lubricating Apparatus.

Claim No. 2, the one in issue, reads as follows:

> "2. The combination with a headed nipple for receiving lubricant, of a lubricant compressor having a coupling member for connecting said compressor and nipple comprising a cylinder, a piston movable within the cylinder and having an aperture for the discharge of lubricant thereof, an apertured sealing seat carried by said piston for engagement with the end of the nipple, connecting the piston aperture with a passage through the nipple, radially movable locking elements carried by the cylinder coacting with the nipple and actuated by said piston for compressively clutching the elements upon the nipple whereby the pressure of the lubricant on said piston will move the piston to forcibly compress said elements while the lubricant is passing through said connecting parts."

The patent deals with a lubricating apparatus. Butler's object, as stated by him, was "to provide a means of forcing under high pressure fluid and semi-fluid lubricating compounds into bearings, * * * in order that foreign material and used lubricant therein may be forced out of the bearing * * *." His specifications described a "co-operating bearing and self sealing bearing lubricating valve, * * * a bearing reservoir for lubricant and means for automatically feeding the lubricant therefrom to the bearing, * * *" and "automatic and semi-automatic means of connection between the bearing valve and the lubricating pressure means * * *" are described.

Judge Lindley, describing the patent, said:

> "* * * Butler was the first to propose or to devise a lubricating system in which the sealing of the joint between the end of the nipple and the coupler and the mechanical grip between the nipple and the coupler were achieved automatically by the pressure of the lubricant in and by the normal pumping operation of the compressor, * * * the advantage of this combination

> arises from the fact that in the greasing of automobiles, in forcing grease into the bearing through the narrow opening of the fitting, thousands of pounds of pressure are sometimes utilized * * * * * * due to the peculiar shape of this nipple, its head and shoulders couple with the gripping jaws of the coupler in such a way that, when pressure is exerted and the grease passes from the coupler into the fitting, the coupler grabs hold of the projecting shoulder of the nipple with its jaws and automatically, as the pressure of the grease increases, simultaneously, the power, force, and closure of the connection increases, so that it is impossible for grease to escape and any desired pressure of grease may be transmitted without breakage of parts or leakage of material. All this was accomplished without further manipulation other than the easy, almost automatic, attachment of the coupler to the nipple and the application of the pressure."

In short, the asserted superiority and virtue of the Butler lubricating apparatus are twofold: (a) The apparatus permits of the application of thousands of pounds of pressure with no loss of grease, and (b) an easily operable device wherein the coupler's grip increases with the pressure of the grease.

The substance of the more important findings of the trial court is:

1. In practical operation, grease pressures running up to thousands of pounds per square inch are frequently required in order to force the grease into the interstices of a bearing.

2. When the compressor is operated under these high pressures, the tendency is to burst the compressor, coupler, and the nipple, and to break open the connection between the coupler and the nipple by forcing these parts asunder. To avoid this break or separation of coupler and nipple, the maximum tightness of seal and the maximum mechanical grip must be obtained and must be proportional to the pressure of the grease to be transmitted.

3. In the Butler apparatus the automatic end seal and the automatic grip both become more effective as the lubricant pressure increases and the need for a more effective seal and grip becomes greater. Butler's seal member is movable and thus may adjust itself to fittings of slightly different dimensions.

4. In the Butler combination the end seal and automatic

grip both become more effective as the lubricant pressure increases. The end seal member is movable and thus may adjust itself to fittings of slightly different dimensions. Any resiliency referred to in the patent as constituting spring fingers serves the purpose of compensating for any slight out of roundness of the fitting.

5. Butler presented to his solicitor a sample device including a coupler, the jaws of which were forced into clamping engagement with the nipple by a relatively rigid, hollow, cylindrical part corresponding exactly to the disclosure of Figure 2 in the Butler patent.

6. Butler was the first to devise a lubricating system in which the sealing of the joint between the end of the nipple and coupler and the mechanical grip were effected automatically by the pressure of the lubricant, which pressure was produced by the normal pumping operation of the compressor.

7. Claim 2 is the only one in issue and describes a combination of seven elements: (a) nipple, (b) a compressor, (c) cylinder, (d) piston, (e) aperture, (f) jaws, (g) sealing seat. "Each and all of these parts cooperate with one another in new ways in the accomplishment of a new and unitary result."

8. Appellee began selling Butler lubricating equipment in April, 1933, and prior thereto sold apparatus covered by the Gullborg and Zerk patents. From April, 1933, to March, 1936, it sold 281,555,000 fitting parts of the Butler combination, and 6,306,000 coupler parts. Over half of the latter were sold with the associate compressors to automobile manufacturers, to be put in the tool kits at the factory. Within eight months after its introduction, the Butler system had been adopted as the factory lubricating equipment of every automobile and truck made in the United States with one exception.

9. "The mechanism embodied in the means by which the jaws are compressed about the nipple of * * * (appellee's) system is identical in its mechanical principles with that disclosed in the Butler patent. It is a simple equivalent involving a mere reversal of parts."

10. Appellee's system comprises a combination of elements, as set forth in claim 2 of the Butler patent.

11. Prior to 1933, appellant was engaged in the business of making and selling automobile lubricating equipment to appellee. In 1933, it began selling lubricating apparatus to others. It made and sold couplers and nozzles with the ex-

pectation that they would be used with appellee's apparatus. Its nipples were sold with the knowledge that they could, and would, be used as part of appellee's combination. The dimensions of appellant's fittings are exactly such as to fit appellee's coupler. If they did not select exact dimensions such cooperation would have been impossible. Appellant's "Lincoln Kleenseal Fittings" were sold to be used in combination with the compressor and coupler parts of the Butler combination as made and sold by appellee. Appellee sold its compressor and coupler parts of the combination to public garages and service stations in the United States, and appellant offered its coupler parts to be used by the said garages in connection with the Butler combination. Appellant duplicated fitting for fitting all of the arbitrary dimensions of the entire line of appellee's fittings.

12. The Butler patent does not require the use of spring fingers which can yield a substantial amount.

13. Appellant's model of Figure 2 of the Butler patent does not accurately or fairly represent the invention of Butler.

14. Claim 2 of the Butler patent describes both a "Lincoln Kleenseal" fitting, appellant's product, and "Alemite Hydraulic" fitting, appellee's product.

As conclusions, the court found:

That claim 2 of the patent is valid, and defendant contributorily infringed it by the sale of "Kleenseal" nipples or fittings, exemplified in plaintiff's Exhibits 27a and 27b; and that appellee is entitled to an injunction and to an accounting.

Appellant challenges the decree on three separate, distinct grounds, stating each with commendable frankness, brevity, and clarity:

(1) Butler's hose coupler can not be validly claimed in combination with a non-patented lubricant receiving nipple or an old compressor, particularly where his conceded purpose is not merely to monopolize the hose coupler, but to include in the monopoly the admittedly old device which is used with it. To support this position appellant relies upon *Bassick Manufacturing Co.* v. *Hollingshead Co.* and *Rogers* v. *Alemite Corp.*, 298 U S. 415.

(2) The coupler of the Butler patent shown in Figure 2 is not the so-called "Alemite Hydraulic" coupler. Supporting this position, appellant relies upon the facts brought out

by the evidence and the holding in *Stewart-Warner* v. *Jiffy Lubricating Co.*, 81 F. (2d) 786.

(3) The Butler multi-jaw chuck type hose coupler is not a patentable improvement over the multi-type hose coupler of the prior art. As bearing upon this issue, it contends that the evidence does not support the finding of validity because the Butler hose coupler as described by Butler both in Figure 2 and in his claim never went into commercial use. It likewise argues that extensive use where the trade was so dominated by Stewart-Warner is not persuasive of validity.

The importance of the suit and the effect of the Bassick opinion upon the whole field of patent law make it impossible for us to dispose of the case in an opinion of desirable and satisfactory brevity.

While going no further than is necessary to defeat the patent in the present case, the conclusion from appellant's brief is unavoidable, that *Bassick* v. *Hollingshead, supra,* revolutionized the law of patents and repudiated the position of courts, including many decisions in this circuit, long accepted as the law in patent cases. This revolutionary concept was accepted and applied by the District Court (in Pennsylvania) in *Stewart-Warner* v. *Universal Co.*, 15 F. Supp. 410.

The Bassick opinion, while dealing with another patent, is more persuasive in this case, because the patent in issue here deals with some of the same old elements of a combination as were described in the Gullborg patent, the validity and infringement of which were the subject matter of the *Bassick* v. *Hollingshead* opinion.

The Gullborg patent had been the subject of much litigation, as pointed out in the opinion, and it dealt, as here with (1) a type of pin fitting, (2) a grease gun, (3) a connecting hose, and (4) a type of coupler.

While it is, of course, conceded that every opinion must be read in the light of the facts to which it applies, yet there are cases where the differences in the facts are so inconsequential, so immaterial, that the opinion must be accepted as authoritative and controlling.

The uppermost question in this case is the controlling effect of the *Bassick* v. *Hollingshead* opinion, *supra.* We are not disposed to limit it in order to bring about an avoidance of any new principle it may announce. Nor are we inclined to give it an effect which was not intended, if it does not follow from a fair construction of its language.

The novel proposition which appellant seeks to apply to the present case is to be found in the language on pages 424, 425. There it was said:

> "It is plain that Gullborg invented improvements of two of the mechanical elements of an old combination consisting of grease pump, hose, hose-coupler and a grease cup or pin fitting. First, he contrived an improved pin fitting. This he patented as such (No. 1,307,733). Secondly, he invented an improved form of coupler to be attached to the end of the hose leading from the pump to the fitting. Instead of patenting this, as he did the pin fitting, he claimed a combination of pump, hose-coupler, and pin fitting, and embodied in the combination his improved form of coupler. (No. 1,307,734, the patent in suit; claims 1-6, 8 and 10.) He further claimed the combination between his patented pin fitting and any form of grease gun whether that claimed in his patent or unpatented and old in the art. (Claims 14 and 15.) *The question then is whether, by this method, the patentee, by improving one element of an old combination whose construction and operation is otherwise unchanged, may, in effect, repatent the old combination by reclaiming it with the improved element substituted for the old element.* That this cannot be done is shown by numerous cases in this and other federal courts."

The paragraph of the opinion which follows the quotation serves as a modifier of the strict letter of the rule thus announced. There, the court says:

> "*Leeds & Catlin* v. *Victor Talking Machine Co.*, 213 U. S. 301, 325, on which the respondent relies, is not in point. There the patent was a pioneer patent and the combination was of elements which were novel and neither of which possessed utility without the other. Each element was necessary to the operation of the other. The invention did not, as here, consist of the mere improvement of one element of an old combination."

If the court announced a rule in the Bassick case as contended by appellant's counsel, or if all of its implications (the substitution of a new element for an old element does not afford the basis of a valid patent) be accepted as the present law respecting the validity of patents then *Leeds & Catlin* v. *Victor Talking Machine Co.*, 213 U. S. 301, is overruled. However, instead of stating that the Leeds & Catlin opinion is

overruled, the court distinguished it and thereby impliedly recognized the soundness of the rule there announced.

Until and unless there is an express repudiation of the *Leeds & Catlin* v. *Victor Talking Machine Co.* case, we can not accept the *Bassick* v. *Hollingshead* opinion as being inconsistent with the views stated in the former opinion. In other words, we must apply to the instant case the rules of law which govern and apply the tests which have long been applied to determine whether the Butler combination is a patentable invention.

In dealing with product patents and their validity it might be observed that the word "combination" is somewhat unfortunate. A combination contemplates a plurality of units, yet patentable invention can only reside in a combination when it (the combination) is *considered as a unit.* For convenience's sake, courts speak of elements in a combination as units in and of themselves. It is only for the sake of convenience that reference is made to such *elements* as 1, 2, 3, 4, and 5. Each and every valid claim of a patent covers a *unit,* although in a combination claim the unit may have five parts or elements. When we so consider a claim it is clear that one unit must differ from another unit if one element, say element three in one combination is different from element three in another combination. To illustrate: If one mixes five different colored paints in stated proportions, he would have a product which might be denominated X. X must be viewed as a unit. If the same individual mixed in the same proportions five different colored paints, four of which were similar to the ones in the first combination but one was different, the final product would not be the same. In testing the validity of any machine or product patent, then, whether it be what is commonly called a combination, or a single, a non-composite substance, the following propositions may be accepted as sound:

1. All the elements may be old but if they have never appeared together in combination and they co-act so as to avoid the charge of aggregation, the unit *may* constitute a valid claim of a patent.

2. Where a combination consists of five elements—1, 2, 3, 4, and 5—and the inventor uses four old elements—1, 2, 3, and 5,—in the same way and for same purpose as in the previous combination, but substitutes a new element 4 for old element 4 of the old combination and obtains desirable re-

sults, the new combination may be the subject of a valid claim. It is not anticipated by the previous combination.

3. Likewise, one may substitute for element 4 an old and well-known element but which has never been used in combination with elements 1, 2, 3, and 5, and these elements being presented in the new combination for the first time may be the subject of a valid patent.

In stating these propositions, we have used the word "*may*" for there are other factors to be considered in determining patentability. For instance, the novelty may not be patentable. The advance may represent the skill of the artisan or the mechanic, not the genius of the inventor. Perhaps it would be better to say that the objection that the combination is lacking in novelty is not sound under the conditions enumerated.

Equally clear is the law which denies to anyone the right to *re*patent an old combination.

Accepting the foregoing principles as sound and applying them to the instant case, we have no difficulty in distinguishing any of the prior art. Nor are we troubled by the decision in the Bassick case. The Butler coupling member and his nipple head are novel. Their structures are clearly distinguishable from the prior art. Whether the other mentioned elements are old is immaterial.

The only validity questions left relate to combination as distinguished from aggregation and the character of the discovery—whether it marks patentable novelty or mechanical skill. In passing, it might be observed that if a new product is found to be patentably novel, it is immaterial whether said patentable novelty is of the pioneer type or "the mere improvement type" of invention.

Appellant also relies upon the Bassick case as authority for its contention that contributory infringement is not disclosed upon a showing that it furnished nipples and grease guns, even though made in such a way as to be used as an element in the Butler combination.

The last paragraph of the Bassick opinion is cited in support of appellant's position. It reads as follows:

> "We are of the opinion that the owner of the patents cannot extend the monopoly of its patent for a pin fitting to preclude the use therewith of any grease gun not embodying the improvement in the coupling device evidenced by the patent in suit; and cannot extend the monopoly of the combination patent in suit to prevent the

use of a pin fitting which does not infringe the fitting patent, 1,307,733, with a gun having a coupler such as that claimed in the patent in suit."

We accept, of course, without question this opinion as applied to the facts in the case that was before the Supreme Court.

In the instant case, Butler does not seek to extend the monopoly of a patent for a pin fitting or to preclude the use of a grease gun in any apparatus not embodying the improvement described in the patent.

Two questions are determinative: First, did Butler set forth a valid patentable combination when he wrote his claim No. 2? Second, did the sale of a headed nipple or a lubricant compressor made for the sole purpose of being used in connection with the apparatus made according to the Butler patent, constitute infringement?

Combination or Aggregation. As we view claim 2 of the Butler patent, it spells combination, not aggregation. It is not the names of the various parts that determine this question. If there be coaction of elements so as to make a single unitary structure, we have a combination. The nipple head may be a non-composite apparatus. It may be the subject of a valid patent claim. Likewise, it may be a part of a combination.

In the instant case, it is conceded that the headed nipple was not patented. More, it is not patentable. It will be assumed that it was old. Nevertheless, if it is an element in an otherwise valid combination (due to the novel coupling method), it is a unit of said combination and a third party supplying it, if other necessary facts are shown, may thereby infringe.

Whether the supplier of headed nipples or other elements of the combination set forth in claim 2 is a contributory infringer depends first on whether the element supplied is a part of a valid combination (as distinguished from an aggregation), and second, on whether the producer so constructs it that it can be said that it was knowingly made with the intention that it would be used in connection with the patented combination.

There is an exception to this statement—If an element of a patented combination in the very nature of its use wears out and a new one is supplied, it may be furnished without the producer's infringing. *Heyer* v. *Duplicator Mfg. Co.*, 263 U. S. 100; *Leeds & Catlin Co.* v. *Victor Talking Machine Co.*, 213 U. S. 325. But, where the intent is present, as here, to sup-

ply separate units of a patented combination and not as a renewal of a worn out part, contributory infringement is disclosed.

The findings of the District Court on this question respecting the dimensions of appellant's headed nipple clearly show an intention to make parts which could only be used in connection with the patented combination. If, then, the Butler claim No. 2 disclosed a valid combination, infringement was shown.

In dealing with this subject of contributory infringement, it might be observed that we are dealing with a phase of the general subject of torts. An infringer is a tort feasor. A contributory infringer is one whose action contributes to the infringement.

Because of the statute, the owner of a patent is entitled to exclude others from making, selling, or using the patented product. Violation of any of these rights makes the violator a tort feasor, an infringer. Making, buying or selling a non-patented article is not of itself infringement. It only becomes so when said maker, seller or user does so knowing that the non-patented element is to be used in connection with other elements in a valid combination covered by a valid patent. This is the doctrine of contributory infringement.

In the instant case, the court has made findings, and the facts leave no doubt as to the soundness of such findings, to the effect that the non-patented parts made by appellant were not only intended for use in connection with Butler's patented combination but they could hardly be used otherwise. The size and dimensions of the fittings most conclusively demonstrate this fact.

It might be asserted that appellant did not infringe when it *manufactured* one element of the product for it could have been sold to one who would use it other than in the Butler patent combination. However, when it appears that such products were made by the appellant and sold to garages and it further appears that the fittings were of such measurement as to preclude their use except on appellee's patented apparatus, contributory infringement both in selling and in using is established.

To establish contributory infringement the following facts must appear: (1) a valid patent; (2) ordinarily in a product patent covering a combination; (3) the alleged infringer must make or supply one or more of the elements of the combination with the knowledge and intention that the same is to be used in the patented combination.

Contributory infringement is the outgrowth or result of the application of the following legal propositions:

(1) A patentable combination is a unit in the contemplation of the law.

(2) Some elements of the combination may be old and others new, or all old, or all new.

(3) One who makes, sells or uses the combination without permission of the patentee is an infringer.

(4) One may be a contributory infringer although he makes, sells or uses an element that is old and not covered or coverable by a patent.

(5) When the manufacturer makes, uses or sells an unpatented (an old) element, he becomes a contributory infringer only when the element is knowingly made, sold or to be used as a part of a patentable combination without patentee's express or implied consent.

(6) Implied consent exists when in the ordinary use of the patentable combination one element constantly and frequently wears out and must be replaced. *Heyer* v. *Duplicator, supra.* Whether there is a consent is often a fact issue, but not involved in the instant suit.

In the last analysis this question of contributory infringement in the instant suit must be determined by the existence or absence of a valid combination wherein one of the essential elements was a product made by appellant. If the elements do not spell a combination, but are merely an aggregation, there is of course no contributory infringement.

For obviously, infringement can exist only when there is a valid patent. No valid patent can cover a group of elements which are correctly termed an aggregation and which do not conform to the correct legal definition of a combination. There is a valid combination only when the element—headed nipple—co-acts with the lubricant compressor and the coupling member. If two of these elements do not co-act and the third element does not likewise co-act with one of the other two members, we do not have a case of valid combination.

Doubt over this issue can only arise when one of the elements may in itself serve a multiple of purposes. It may be used outside the combination of the patent. If so, its use is valid and legitimate. The determining fact issue is the intent and the purpose it serves, and was intended to serve when made or sold. If made, sold or used as an intended element

in the combination which is the basis of the patent claim, it is a case of contributory infringement, otherwise not.

In disposing of the defense of aggregation, we have accepted the rather common meaning of that word and, for the purpose of the argument *only*, assumed it to be a valid defense in patent cases when established. We have adopted this meaning for the purpose of the argument only, for otherwise we would hesitate before accepting it.

In our opinion the defense of aggregation is considerably overworked. The term "aggregation" is usually preceded by the word "mere" and describes a group of elements which fall *far* short of invention in the user's opinion. It is a generic term used quite loosely to define various structures which fail to embody patentable discoveries.

To illustrate, it is used when a mechanism with a series of independent units which perform their functions separately and uninfluenced by the action of any other unit is being considered. In other cases, it may be adopted when a mechanism is composed of numerous units, but their selection did not call for the exercise of the inventive faculty. In such a case, the discovery may approach but does not attain the high status of invention.

We believe the better view is to accept the term "aggregation," if used at all, as defining a phase of the general term "non-invention." When claims are considered which are composed of a plurality of elements and their individual or collective selection fails to evidence the exercise of inventive faculty, it is of course not a patentable discovery regardless of whether coaction of elements is present or absent. On the other hand, an inventive concept may reside in the selection of a part or parts of numerous old elements. If the selection is unusual and a hitherto pressing unsolved problem is thereby overcome, it answers the tests of the statute.

Invention may be evidenced by the modifying coaction of the elements. That is, the coaction may furnish the satisfactory evidence of the patentability of the discovery. It is hardly logical, however, to say without it (coaction) there can be no invention.

It is one who "has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new or useful improvements thereof, etc.," who is, under the statute, entitled to the name inventor, and under prescribed circumstances is entitled to a patent which will protect his invention. The term "aggregation" is not used. It

has been adopted by the legal profession as descriptive of a machine, or composition of matter, etc., that falls short of invention usually because the elements of the composition do not *coact*. Courts, too, have recognized it as applicable when the machine or composition of matter falls short of invention, because it manifests the skill of the mechanic rather than the genius of the inventor. This has led to emphasis on the term "coaction" of elements when applied to said composition or machine.

When among the group of elements there is correlation or co-ordination of elements which mutually contribute to the same result, there may be invention, notwithstanding there are many decisions which have arbitrarily announced that patentable discoveries are not present unless there is coaction of elements which results in a new or better product.

We are convinced that where there is correlation, cooperation, or co-ordination resulting in mutuality of achievement of a common purpose and contributing to accomplish a desired result, a patentable combination may well be present. Nor is it proper to say that the correlation or cooperation depends on each element's affecting each of the other elements.

In short, in attempting to restrict aggregation to its proper field, it might be said that a combination is present if there be correlation or co-ordination of elements which mutually contributes to the accomplishment of some result and there need be no interdependency in the sense of one element being dependent on the others for functioning.

We are inclined to go still further and question the wisdom of necessitating the presence of a coaction of parts to constitute a valid combination. True, absence or presence of coaction may bear upon the character of the skill required to solve the problem. It is entirely possible to conceive of a case where the selection of the elements which are to act together to produce a desirable or advantageous result, would invoke the exercise of the inventive faculty. While this view may not harmonize with many of the decisions, and it is not applied in the instant case, it seems to us the more logical one. For when we attempt to distinguish between inventive faculty and the skill of the mechanic, we must admit that the former often finds expression in the *selection* of the particular element and it is the *selection* of elements that solved the problem, improved the product, or brought about the desired economies in production costs. Its cooperation with the

other elements may be very limited,—in fact, limited to mutuality of effect or functioning to a common purpose.

Patentable Novelty of the Butler Apparatus. Appellant argues as one of its three major grounds for reversal of the decree that the advance or improvement which Butler made over the prior art did not constitute invention, but merely evidenced the skill of a mechanic confronted by an ordinary mechanical problem.

Upon this issue the District Court found squarely against the appellant and in its opinion pointed to the differences between the prior art structures and the Butler apparatus.

We are not convinced that the discovery belongs to the pioneer class. It was an improvement, but not an outstanding advance. Whether that improvement was such as to justify the issuance of a patent may well be and is seriously debated.

We are not impressed by the evidence of wide and popular acceptance of the patented apparatus which is so controlling in doubtful cases. *Wahl Clipper Corp.* v. *Andis Clipper Co.*, 66 F. (2d) 162.

Appellee occupies such a position in this lubricating field that any lubricating system it might offer to the garages and automobile manufacturers would result in enormous sales of parts. There is no doubt but that the figures appearing in the court's findings, standing alone, are impressive. A sale of 280,000,000 fitting parts in three years, by any company at any time, is quite startling. They would be more impressive if we knew how many parts were sold under the Zerk patent or under the Gullborg patent, both owned by appellee. The number of automobiles in the United States and the number of parts necessary to supply all of them are both enormous. A company, like the appellee, is apparently able to have its product made part of the standard equipment of most automobile companies, and thereby would naturally sell millions of parts of a lubricating system throughout the entire United States. It is for this reason that we have not allowed the sale figures to influence our judgment on this issue of validity of the patent.

It is only after observation of the various lubricating systems that we have come to the same conclusion as was reached by the District Court. If the advance which Butler made was merely the solution of a mechanical problem, we are at a loss to understand why that solution was so long delayed. Holding one part of the lubricating system against another while

pressure was applied and grease squirted in all directions, or making the connection by the pin and slot or bayonet type while crawling under cars and reaching between spokes of a wheel, was so unsatisfactory as compared to the Butler method that the delay in producing this new method of connection is explainable only upon the theory that the problem was beyond the solution of the mechanic skilled in the art.

What was the problem which confronted the maker of lubricating systems? First and foremost was the need of high pressure apparatus. The pressure had increased in the passing years. First 500 to 750 pounds was considered high, then 1500 to 2000 pounds. The Butler system permits of pressure up to 7500 pounds. It is apparent that high pressure was extremely desirable. The difficulty to be overcome in the making of a high pressure system was in the connection between the coupler and the pin head. Butler's solution was most satisfactory because the higher the pressure, the tighter the connection—the better the fitting.

Another problem which confronted the manufacturer was easy connection. Crawling under the car or reaching points rather inaccessible was unsatisfactory.

The trial judge found, and there is testimony to support this position, that in the lubricating field the method adopted had never been used before. It was novel in the lubricating field. It may not have been wholly new in the entire field of mechanics, but it was novel in this particular field. Its conception or its selection, under all the circumstances, we conclude was invention and entitled to the protection of a patent.

Appellant argues, as an additional ground for reversal, that claim 2 of the Butler patent and Fig. 2 of the drawings accompanying the same do not cover its accused nipple. It likewise argues that appellee's "Alemite Hydraulic" coupler is not the coupler of the Butler patent.

The District Court found squarely against appellant on this issue.

The question has been elaborately argued both on the oral argument and in the brief. To reproduce the drawings and set forth the positions of the two sides would almost double the length of this opinion, and we fear we would not add much to the statement of our conclusions respecting these conflicting positions.

The question is not whether Fig. 2 of the drawings fully represents the concept of the inventor. Figures which ac-

company the patents are often presented merely to elucidate the thought expressed in the specifications. Their study is decidedly helpful in most cases, but it can hardly be expected that all of the possible variations in structures will be set forth in specifications or drawings. Frequently the improved type is described in detail. True, there are instances where specificity is necessary in order to distinguish the invention from the prior art. More frequently however, it is the principle of operation which is being illustrated rather than an effort to confine the invention to the exact figures shown in drawings.

This seems to have been the thought of Judge Lindley when he said:

> "The Alemite Hydraulic System (appellee's) comprises the combination of elements set forth in claim 2 of the Butler patent. * * * There is nothing in the Butler patent which requires the use of spring fingers which can yield a substantial amount. * * * The Alemite Hydraulic coupler will grip and form a sealed combination with a Lincoln Kleenseal fitting as well as with an Alemite Hydraulic fitting and claim 2 of the Butler patent described one combination as well as the other."

He further stated:

> "The mechanism embodied in the means by which the jaws are compressed about the nipple of the Alemite Hydraulic system, is identical in its mechanical principles with that disclosed in the Butler patent. *It is a simple equivalent involving a mere reversal of parts.* The Alemite Hydraulic system comprises the combination of elements set forth in claim 2 of the Butler patent."

Our conclusion is that such departures from the Butler patent as were made in the commercial structures were nevertheless the equivalent of the Butler claim, and they embodied the mechanical principles which were described in the Butler patent. In other words, we agree with the District Court that appellee's Alemite Hydraulic system was an embodiment of claim 2 of the Butler patent.

The decree is

AFFIRMED.

And on the same day, to wit, the 29th day of June, 1937, the following further proceedings were had and entered of record:

Tuesday, June 29, 1937.

Before:

Hon. Evan A. Evans, Circuit Judge.
Hon. William M. Sparks, Circuit Judge.
Hon. J. Earl Major, Circuit Judge.

Lincoln Engineering Company of Illinois, *vs.* Stewart-Warner Corporation.	Appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division.

6103

This cause came on to be heard on the transcript of the record from the District Court of the United States for the Northern District of Illinois, Eastern Division, and was argued by counsel.

On consideration whereof, it is now here ordered, adjudged and decreed by this Court that the decree of the said District Court in this cause appealed from be and the same is hereby affirmed, with costs.

And afterwards, to wit, on the 19th day of July, 1937, there was filed in the office of the Clerk of this Court a petition for rehearing, which said petition for rehearing is in the words and figures following:

IN THE

United States Circuit Court of Appeals

FOR THE SEVENTH CIRCUIT.

No. 6103.

LINCOLN ENGINEERING CO. OF ILLINOIS, Defendant-Appellant, vs. STEWART-WARNER CORPORATION, Plaintiff-Appellee.	Appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division. Honorable Walter C. Lindley, District Judge.

Appellant's Petition for Rehearing.

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IN THE

United States Circuit Court of Appeals,

FOR THE SEVENTH CIRCUIT.

APPEAL No. 6103.

LINCOLN ENGINEERING COMPANY OF ILLINOIS,
Defendant-Appellant,

v.

STEWART-WARNER CORPORATION,
Plaintiff-Appellee.

PETITION FOR REHEARING OF THE LINCOLN ENGINEERING CO. OF ILLINOIS.

To the Honorable the Judges of This Court:

The appellant herein, the Lincoln Engineering Co. of Illinois, respectfully petitions this Court to grant a rehearing of this cause, and especially to reconsider certain essential statements and conclusions of the Opinion filed herein on the twenty-ninth day of June, 1937 [1] and also certain omissions therefrom.

As the basis for such rehearing and reconsideration, appellant respectfully submits that the Court, as shown by its opinion herein, erred in the particulars hereinbelow specified:

I.

In its opinion of June 29th, 1937, this Court said on page 10:

> "The last paragraph of the Bassick opinion is cited in support of appellant's position. It reads as follows:

[1] The appellant, by the specifications contained in this Petition for Rehearing does not intend to waive, but rather still insists upon, each of its contentions heretofore made in its briefs on file, but it particularizes in this Petition for Rehearing only those matters as to which it believes that the Court's conclusions were based upon clear errors in its understanding of the facts, or were reached because of an apparent oversight, and certain essential matters which the Court failed to consider.

> 'We are of the opinion that the owner of the patents cannot extend the monopoly of its patent for a pin fitting to preclude the use therewith of any grease gun not embodying the improvement in the coupling device evidenced by the patent in suit; and cannot extend the monopoly of the combination patent in suit to prevent the use of a pin fitting which does not infringe the fitting patent 1,307,733, with a gun having a coupler such as that claimed in the patent in suit.'
>
> "We accept, of course, without question this opinion applied to the facts in the case that was before the Supreme Court.
>
> "In the instant case, Butler does not seek to extend the monopoly of a patent for a pin fitting or to preclude the use of a grease gun in any apparatus not embodying the improvement described in the patent."

The part of the Opinion of the Supreme Court in the Bassick case so quoted by this Court, contains *two* separate and distinct prohibitions. This Court has apparently overlooked and failed to reckon with the second of these two prohibitions which is more directly applicable to the case at bar, to wit, that a patent owner

> "cannot extend the monopoly of the combination patent in suit (predicated upon a patentable coupler) to prevent the use of a pin fitting which does not infringe the fitting patent 1,307,733 (that is, a grease-cup, 'fitting' or 'nipple' of the prior-art) with a gun having a coupler such as that claimed in the patent in suit." (Parenthetical inserts ours.)

Gullborg's so-called "combination" claim 2, just like Butler claim 2, is predicated upon invention found in the coupler, the only device specifically defined in the claim; whereas, the old grease-cup, "nipple" or "fitting" of the prior-art and the old pump of the

prior-art are included in both claims only in broad and all-inclusive generality to comprehend the entire class of old grease-cups, "fittings" or "nipples" of the prior-art with which the specifically improved coupler may couple and to comprehend the entire field of pumps, both old and new, with which the specifically new coupler, (just as all old couplers) must be used in order to have utility.

The Supreme Court distinguished between the patentability of the *combination* of elements [2] which constituted the improved coupler, and the so-called "combination" with the improved coupler of the *old* grease-cup and *old* pump with which the improved coupler (like all old couplers) had to be used. This Court failed to distinguish between these two essentially different concepts of the word "combination" as applied to patent claims.

Thus, claim 2 of Gullborg Patent No. 1,307,734, just like claim 2 of the Butler patent here in suit, claimed the "combination" of a specifically improved coupler (which was found to be *new* and patentable) with an *old* pump and an *old* prior-art *grease-cup*, "fitting" or "nipple".

Gullborg also had another patent No. 1,307,733 on a "fitting" per se, covering a novel combination of elements constituting a specifically new "pin-fitting" per se. Defendant Rogers' accused "fittings" (just as in the case at bar) were merely *prior-art* "fittings" however. Thus, Rogers did not infringe the "fitting" patent 1,307,733, just as defendant-appellee's "fitting" in the case at bar infringed no other "fitting" patent.

The Supreme Court said, inter alia, that the owner of the Gullborg Patent No. 1,307,734 "cannot extend the monopoly" of "combination" claim 2 of the Gullborg Patent No. 1,307,734

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[2] some old and some new, or perhaps all old or perhaps all new.

(which claimed Gullborg's specifically new coupler in so-called "combination" with the old pump and the old grease-cup, "fitting" or "nipple")

"to prevent the use of a pin fitting" which was old and *not* covered by any patent owned by plaintiff "*with* a gun having *a coupler such as that claimed in the*" Gullborg *Patent* No. 1,307,734.

This Court has apparently overlooked this second prohibition of the Supreme Court because in its Opinion of June 29, 1937, this Court treated *only the first* of the *two* prohibitions so quoted by this Court.

II.

In its Opinion of June 29, 1937, this Court said on page 6:

> "While going no further than is necessary to defeat the patent in the present case, the conclusion from appellant's brief is unavoidable, that Bassick v. Hollingshead, supra, revolutionized the law of patents and repudiated the position of courts, including many decisions in this circuit, long accepted as the law in patent cases. This revolutionary concept was accepted and applied by the District Court (in Pennsylvania) in Stewart-Warner v. Universal Co., 15 F. Supp. 410."

This Court erred in the above-quoted portion of its Opinion of June 29, 1937.

We believe that this Court was unwittingly misled into making this erroneous statement by the inch-thick "pamphlet" entitled:

> "A Collection of Cases in Each of Which the Circuit Court of Appeals for the Seventh Circuit Has Sustained a Claim for a Combination Distinguished From the Prior Art Only by the Addition or Substitution of a Single Novel Element
>
> With
>
> A Copy of the Patent Sustained in Each Case."

which plaintiff submitted to this Court with the following misleading statements on pages 66 and 67 of its brief:

> "We believe that these matters deserve the careful attention of this Court because, if the decision of the Supreme Court in the Rogers case means what counsel for the appellant would have it mean, then certainly **there has been a revolution in all of the patent law** as understood and applied by this and every other Federal Court throughout the entire history of the patent system.
>
> "We have compiled and are filing with this brief an interesting document. It contains the opinions of this Court in the thirty cases in which the Court has held to be valid, a patent claim describing a combination distinguished from the prior art only by the addition or substitution of a single novel element. In each instance the opinion of the court is coupled with a copy of the patent thus held to be valid.
>
> "These decisions show that this Court, throughout its entire existence, has consistently adhered to the principle that a combination may be patentable if distinguished from the prior art only by the addition or substitution of a single novel element, even if all of the other elements had theretofore been organized in the same relationship.
>
> . . . . . .
>
> "The cases in which this Court has endorsed and applied that principle are too numerous for discussion here. It is for this reason that we are filing a compilation of abstracted opinions of this Court in a long succession of cases in which this principle of the Leeds & Catlin cases has been applied.
>
> "We have no doubt that similar compilations could be made from the opinion of every other Federal Court.
>
> "An examination of our compilation of the opinions of this Court will convince your Honors

> that *if the Supreme Court really intended on May 18, 1936 to overturn all of the law of the Leeds & Catlin cases, it would be highly desirable in the interests of everyone concerned, to give the Supreme Court an opportunity to make that intention far more clear and definite than it has been made in and by its decision in the Hollingshead and Rogers cases,* 298 U. S. 415 (80 L. Ed. 782)." (Emphasis ours.)

We submit that by the above statements plaintiff-appellee has also misled this Court into overlooking (or into erroneously rejecting) the second of the two prohibitions of the Supreme Court in the Bassick case hereinabove pointed out.

We submit that the thirty (30) adjudicated patents of which copies were submitted to this Court by plaintiff-appellee, and the decisions adjudicating these thirty patents, are **not** in any way relevant to Issue No. 1 presented by defendant-appellant, nor do these thirty patents and decisions have any bearing upon the Supreme Court's decision in the Bassick case cited by the defendant-appellant as its authority on said Issue No. 1.

Plaintiff-appellee's above quoted statements respecting these thirty patents and thirty decisions were misleading because none of the thirty patents included in plaintiff-appellee's aforesaid "pamphlet" bears any analogy whatever to the Butler patent here in suit, because each of said thirty (30) patents claimed a combination of elements constituting the one device which the patentee invented, whereas the Butler patent in suit (just like the Gullborg Patent No. 1,307,734) does not merely claim the combination of elements constituting the novel coupler (the *one* and only device invented by the patentee) but goes further to claim the new coupler (the patentee's contribution) in so-called "combination" with an admittedly *old pump* and with an admittedly *old grease-cup* or so-called "fitting" or

"nipple", which are *separate and distinct devices* neither invented nor improved by the patentee, but merely constituting the old mechanical environment in which the patentee's improved coupler (just as all old couplers) is customarily used.

We submit that the Supreme Court's clear and unequivocal decision in the Bassick case is controlling in the case at bar to dismiss the bill (as was done in Stewart-Warner v. Rogers and Universal, 15 Fed. Supp. 410), and does **not** create a "revolution in all of the patent law" as falsely suggested by plaintiff-appellee. Nor is it necessary for this Court to repudiate its thirty (30) earlier decisions in order to apply the Supreme Court's decision in the Bassick case against plaintiff in the case at bar.

We submit it is indeed plaintiff-appellee's concept of "combinations" which is revolutionary and which was expressly condemned by the Supreme Court in the Bassick case and which is *not* supported in any way by the thirty (30) decisions of this Court cited by plaintiff in its aforesaid "pamphlet".

The thirty (30) adjudicated patents handed up to this Court by plaintiff-appellee bear no analogy whatever to the Butler patent here in suit nor to the Gullborg patent in the Bassick case. This is best shown by the fact in each of these thirty (30) patents a single unitary device was invented and properly claimed as such. *Each patent claimed the combination of elements*[8] **constituting one device**, as for instance, the *stove pipe* in Milcor v. Reeves (79 F. 2, 29); the *hair clipper* in Brown v. Wahl (85 F. 2, 458); the *bolt-tightener* in Nordberg v. Woolery (79 F. 2, 685); the *oil-seal* in Chicago v. Victor (78 F. 2, 417); the *coal loading machine* in Joy v. Herzler (39 F.

[8] some elements of the combination old and some elements of the same combination new.

2, 761; the *trousers hanger* in Cazier v. Mackie (138 F. 654); the *pump* in Featherstone v. De LaVergne (80 F. 918); the *car-heater* in Crane v. Baker (125 F. 1); the *telephone transmitter* in International v. Kellogg (171 F. 651), etc. *None of the thirty (30) claimed the improved device with another device with which it would normally be used.*

The Milcor v. Reeves case (79 F. 2, 29) relied upon by plaintiff-appellee, would have been analogous to the case at bar and to the Bassick case, if the patentee Krantz therein had not merely claimed the combination of elements constituting his improved *stove pipe,* but had claimed his improved stove pipe in so-called "combination" with the old stove with which it is to be used. This Krantz did *not* claim.

The Brown v. Wahl case (85 F. 2, 458) relied upon by plaintiff-appellee, would have been analogous to the case at bar and to the Bassick case, if the patentee Wahl therein had not merely claimed the combination of elements constituting his improved *hair clipper,* but had claimed his improved hair clipper in so-called "combination" with the old electric cord and electric plug with which it is to be used in actual practice (and without which the electric clipper is indeed inoperative and useless, because an electric clipper, like all electric appliances, *must* "co-act" with a flexible electric conductor or "cord" and an electric plug, and indeed, with an electric wall outlet). This Wahl did *not* claim.

The Nordberg v. Woolery case (79 F. 2, 685) relied upon by plaintiff-appellee, would have been analogous to the case at bar and to the Bassick case, if the patentee Woolery therein had not merely claimed the combination of elements constituting his improved *railway bolt-tightening machine,* but had claimed his railway bolt-tightening machine in so-called "combination" with the old bolt and nut which it was adapted to grab

and turn, and in so-called "combination" with the old railway track which was necessary for its support and which held the railway bolt-tightening machine in operative alignment with the bolt and nut. This Woolery did *not* claim.

The Chicago v. Victor case (78 F. 2, 417) relied upon by plaintiff-appellee, would have been analogous to the case at bar and to the Bassick case, if the patentee Clark therein had not merely claimed the combination of elements constituting his improved *oil-seal* device, but had claimed his improved oil-seal device in so-called "combination" with the rear axle shaft which extends through the center of the oil-seal device and the rear axle housing which surrounds it on the outside, and with which shaft and housing such oil-seal device *must* be used and *must* "co-act" in order to have utility. This Clark did *not* claim.

The Joy v. Herzler case (39 F. 2, 761) relied upon by plaintiff-appellee, would have been analogous to the case at bar and to the Bassick case if the patentee Joy therein had not merely claimed the combination of elements constituting his improved *coal-loading machine,* but had claimed his improved coal-loading machine in so-called "combination" with the old pit car and the old mine track with which such coal-loading device *must* of necessity "co-act" and with which it *must* be used in order to have utility. This Joy did *not* claim.

The Cazier v. Mackie case (138 F. 654) relied upon by plaintiff-appellee, would have been analogous to the case at bar and to the Bassick case, if the patentee Cazier therein had not merely claimed the combination of elements constituting his improved *trousers hanger,* but had claimed his improved trousers hanger in so-called "combination" with the trousers with which it is to be used. This Cazier did *not* claim. Just like

Cazier's improved trousers hanger was adapted to grip a different pair of trousers from time to time, and to "co-act" therewith, so Butler's improved coupler and Gullborg's improved coupler are both adapted to grip or grab and "co-act" with a different grease-cup from time to time. Cazier was satisfied to properly claim the trousers hanger which was his, whereas Gullborg and Butler were not satisfied to claim the coupler which they respectively invented, but claimed their respective couplers together with the *old* grease-cup to be coupled thereby.

The Featherstone v. De LaVergne case (80 F. 918) relied upon by plaintiff-appellee, would have been analogous to the case at bar and to the Bassick case, if the patentee Boyle therein had not merely claimed the combination of elements constituting his improved *pump,* but had claimed his improved pump in so-called "combination" with the other *old* devices of the ice-making system with which the pump was inevitably used and with which the pump necessarily "co-acted". This Boyle did *not* claim.

The Crane v. Baker case (125 F. 1) relied upon by plaintiff-appellee, would have been analogous to the case at bar and to the Bassick case, if the patentee Baker therein had not merely claimed the combination of elements constituting his improved *car-heating device,* but had claimed his improved car-heating device in so-called "combination" with the old car with which it was to be used and with which it necessarily "co-acted". This Baker did *not* claim.

The International v. Kellogg case (171 F. 651) relied upon by plaintiff-appellee, would have been analogous to the case at bar and to the Bassick case, if the patentee Dean therein had not merely claimed the combination of elements constituting his improved *telephone transmitter,* but had claimed his improved telephone transmitter in so-called "combination" with

the many old electrical devices, such as the telephone circuit, the telephone receiver, the storage battery (or other source of electric supply) and indeed, the many other devices with which his improved telephone transmitter had to be used in order to have utility. This Dean did *not* claim.

It is indeed plaintiff-appellee's theory of patents which is revolutionary, because, according to plaintiff-appellee's theory, anyone inventing a new and admittedly patentable device composed of a combination of elements[4] constituting *that* device, need not stop merely at claiming the admittedly patentable combination of elements constituting *his* improved device, but may indeed further claim *that* improved device in so-called "combination", broadly, with all the *old* devices of the prior art with which his improved device must normally be used.

Thus Krantz, for instance, in Milcor v. Reeves (79 F. 2, 29) should not have contented himself with merely claiming the patentable combination of elements constituting his improved *stove pipe*, but might just as well have claimed the so-called "combination" of his new stove pipe with an *old* stove with which his new stove pipe had to be used, and after getting a sufficient acceptance and distribution for his improved stove pipe, charged the manufacturer of the of the old stove (with the proper size of pipe outlet) with contributory infringement in supplying the old stove with the knowledge that the purchaser will use the old stove in so-called "combination" with Krantz's improved stove pipe. Likewise, according to plaintiff-appellee's theory of patents, Woolery, in Nordberg v. Woolery (79 F. 2, 685) should not have contented himself with claiming the patentable combination of elements constituting his improved bolt-tightening machine, but might just as well have claimed

[4] some new and some old, or all new or all old.

his improved bolt-tightening machine in so-called "combination" with the old bolts, with which it was to "co-act" (in the same sense as the coupler "co-acts" with the grease-cup), and then, after getting a wide enough distribution of these bolt-tightening machines, charged bolt manufacturers with contributory infringement in supplying the old railway bolts of the proper size with the knowledge that they would be used with Woolery's improved bolt-tightening machine.

Plaintiff-appellee's submission of these thirty (30) patents to the Court was, we submit, for the purpose of concealing plaintiff-appellee's real purpose, and the ultimate effect of plaintiff-appellee's contentions in the case at bar.

The ultimate effect of plaintiff-appellee's contentions in the case at bar is to give plaintiff a *perpetual* monopoly (far beyond the life-term of the Butler patent) of these very *same* grease-cups or headed "nipples" or "fittings" enjoined in the case at bar.

This may be done, and *is* being done, in plaintiff-appellee's contemporaneous litigation,[5] simply by asserting against the very same grease-cup, "nipple" or "fitting" as in issue in the case at bar, other more recent patents claiming other allegedly improved couplers and nozzles again in so-called combination with the admittedly old grease-cup, "nipple" or "fitting" here involved.

These claims need only be, and are, in patents which successively expire after the date of expiration

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[5] Min-a-max Co., Inc. and Stewart-Warner Corp. v. Scharoun Mfg. Co. and Syracuse Auto Parts, Inc. and Lloyd S. Keeler (Fed. , 32 Pat. Q. 499); Min-a-max Co., Inc. v. Lincoln Engineering Co. and Smith & Gregory, At Law No. 66-363, Southern District of New York; Min-a-max Co., Inc. v. Red Brown Patch Co., Inc., Equity No. 85-7, Southern District of New York; Stewart-Warner Corp. and Lubrication Corp. v. Service Mfg. Co. and Elmer C. Barker, Equity No. 15,536, Northern District of Illinois (at Chicago); Stewart-Warner Corp. and Lubricating Corp. v. J & R Motor Supply, Equity No. 4957, District of Wisconsin.

of the Butler patent here in suit; and thus, the monopoly of the old grease-cup, "nipple" or "fitting" is perpetuated. The Constitution of the United States, Article I, Section 8, paragraph 8 reads:

> "The Congress shall have power . . . to promote the progress of science and useful arts, by securing for *limited times* to authors and inventors the exclusive right to *their* respective rights and discoveries".

The exclusive rights are to be to the inventor's *own* discoveries, *not* to the discoveries of another, nor to that which is old; and it is to be noted that the exclusive rights to such discovery (the inventor's) shall be for *limited* times. They are *not* to be perpetuated.

Not only is it plaintiff's ultimate objective to perpetuate a monopoly of the same grease-cup, "nipple" or "fitting", by the latter patents involving the contemporaneous litigation hereinabove referred to, but indeed, the Butler patent itself would merely perpetuate a monopoly of the grease-cup, "nipple" or "fitting" of a still earlier patent also involved in contemporaneous litigation [6] levelled at the self-same defendant's grease-cup, "nipple" or "fitting" as involved in the case at bar.

Thus, whatever this Court may think of Butler's coupler invention, and however well this Court may think of plaintiff's legal contentions on our Issue No. 1, we wonder whether this Court had any idea of the ultimate effect of plaintiff-appellee's legal contentions on our Issue No. 1;—whereby, even upon the expiration of the Butler patent, defendant's accused grease-cup, "fitting" or "nipple" would *not* be free to defendant

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[6] Jacques v. Lincoln Engineering Co., Equity No. 11,334, in the Eastern District of Missouri (Eastern Div.); Jacques v. Universal Lubricating Systems, Equity No. 3043, in the Western District of Pennsylvania; Jacques v. General Motors Corp., Equity No. 6808, in the Eastern District of Michigan (Southern Div.).

(nor to the public at large). We wonder if this Court's view of the situation would not be different if it appreciated the really revolutionary character of plaintiff's system of patent claiming, whereby the very *same* device can be re-monopolized indefinitely, so long as some improvement can be invented in some *other* complementary device with which the accused device is normally used.

Thus, by plaintiff's system of patent claiming it might have a monopoly of the *same* grease-cup for as many seventeen-year terms as it can invent new coupler improvements.

We respectfully submit that *this was condemned by the Supreme Court* in the Bassick case.

This Court has unwittingly confused the patentability of a combination of elements constituting *one* device [7] with the essentially different situation where such patentable device [8] is claimed in so-called "combination" with another *separate* and distinct device [9] of the prior-art with which the inventor's improved device must be used in order to have utility and with which all devices of the same class have always customarily been used.

If plaintiff's revolutionary theory of patent claiming is to be sustained, it marks a new and unintended expansion of the patent system, for the obvious reason that by far the greatest majority of all mechanical devices are *not* capable of normal use by themselves, however new and improved they may be, but indeed are useful only when used *with* one or more *other* separate and distinct devices not invented or improved by the patentee, but merely constituting the old mechanical

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[7] some of which elements may be old and some new, or all old or all new.

[8] composed of a combination of elements partly old and partly new, or all old or all new.

[9] which other separate device is in and of itself again composed of another combination of elements.

environment in which the patentee's improved device finds its normal use.

Obviously, what the Supreme Court did in the Bassick case was to draw a plain line to mark where the inventor's contribution stops, and to say that while an inventor may have monopoly of his improved device (the coupler), and while the patentability of his improved device (the coupler) may be predicated upon a combination of elements constituting *that* device [10] (the coupler), he may *not* have a monopoly of the *old* grease-cup, "fitting" or "nipple" with which the improved coupler is intended to couple. Precisely that is the situation in the case at bar.

The fallacy of plaintiff's position with respect to the Butler patent here in suit is further demonstrated by the fact that in plaintiff's suit against Jiffy Lubricator Co. (81 F. 2d, 789), the grease-cup, "fitting" or "nipple" charged by plaintiff to constitute the "nipple" element of the apparatus under attack, was the "bayonet" type grease-cup or so-called "pin-fitting" of the Gullborg patent;—so that plaintiff may (in the Seventh Circuit but *not* in the Eighth Circuit) re-monopolize the old "bayonet" type grease-cup or so-called "pin-fitting" of the Gullborg patent, by merely marketing a Butler coupler or a near-Butler coupler of the dimensions to fit the old Gullborg "bayonet" type grease-cup or so-called "pin-fitting".

For the convenience of the Court [11] we have included in an Appendix hereto copies of four different so-called "combination" patents, each of which is predicated upon an allegedly improved nozzle or coupler, but claims such nozzle or coupler in so-called

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[10] some of which elements may be new and some of which elements may be old, or all may be new or all may be old.

[11] Should the Court care to examine further into the contemporaneous litigation hereinabove referred to, based on other so-called "combination" patents levelled at the same grease-cup, "nipple" or "fitting".

"combination" with the same old grease-cup, "nipple" or "fitting" here involved, which (as in the Butler patent) is only generically recited in the claims. In this Appendix, we have also included some references to some of the contemporaneous litigation involving three of these so-called "combination" patents.

III.

This Court in its Opinion of June 29, 1937, said:

> "In short, the asserted superiority and virtue of the Butler lubricating apparatus are twofold: (a) *The apparatus permits of the application of thousands of pounds of pressure with no loss of grease,* and (b) an easily operable device wherein the coupler's grip increases with the pressure of the grease. (Emphasis ours.)

whereas the fact is, as shown by the record, that Butler's coupler was not capable, nor did Butler claim it to be capable, of sealing any pressures greater than that which the old Gullborg coupler did well seal for many years prior to Butler (R. 48).

WHEREFORE, petitioner respectfully urges that a rehearing be granted, and that the mandate of this Court be stayed pending the disposition of this Petition.

Respectfully submitted,

LINCOLN ENGINEERING COMPANY OF ILLINOIS,

Defendant-Appellant,

By LEONARD L. KALISH,

Counsel for Petitioner.

I hereby certify that the above Petition is well grounded in law and proper to be filed and is not interposed for purpose of delay.

LEONARD L. KALISH,

Counsel for Defendant-Appellant, Lincoln Manufacturing Company of Illinois.

Appendix.

Plaintiff-appellee's real purpose and the ultimate effect of plaintiff-appellee's contentions in the case at bar is perhaps best gleaned from an examination of the contemporaneous litigation being conducted and sponsored by plaintiff-appellee under other of its so-called "combination" patents of more recent date (although one having a filing date many years earlier than Butler's filing date); all levelled at the *same* old grease-cup or "fitting" here accused.

We submit herewith a copy of Boker Patent No. 1,802,700, dated April 28, 1931, which does not expire until April 28, 1948, almost *five years after the expiration of the Butler patent.* In Min-A-Max Company and Stewart-Warner Corporation v. Scharoun Manufacturing Company, Syracuse Auto Parts, Inc., and Lloyd S. Koeler (F. Supp. ; 32 Pat. Q. 499), plaintiff, jointly with Min-A-Max Company brought suit to enjoin the use of *another* nozzle or coupler *with defendant-appellant's very same grease-cup, "nipple" or "fitting" involved in the case at bar,* because the Boker Patent No. 1,802,700 there involved, just like the Butler patent here involved, claims an allegedly improved nozzle or coupler in so-called "combination" with the admittedly *old* grease-cup, "nipple" or "fitting" involved in the case at bar. In that case, defendant did not urge the Supreme Court's condemnation of this practice in the Bassick case.

Thus, while in Chicago plaintiff urged that the defendant's admittedly unpatented Kleen Seal grease-cup, "nipple" or "fitting" constituted contributory infringement of the Butler patent, because adapted and intended for use with Butler's couplers as alleg-

edly manufactured by plaintiff; in Albany, N. Y., plaintiff at the same time urged that this very same Kleen-Seal grease-cup, "nipple" or "fitting", as well as the grease-cup, "fitting" or "nipple" of plaintiff's earlier Zerk Patent No. 1,475,980 (considered by this Court in 19 F. 2d, 944) were a part of Boker's "combination", because Boker, like Butler, claimed his improved coupler or nozzle in so-called "combination", broadly, with the old "nipple", "fitting" or grease-cup of the prior-art.

Likewise while plaintiff has urged upon the Court at Chicago in the case at bar that defendant's Kleen-Seal "nipple" "fitting" or grease-cup is the "nipple" of the claim of the Butler patent, it is sponsoring a law suit in the Southern District of New York, No. 66-363 against defendant's manufacturer, the Lincoln Engineering Company of Missouri, and against Smith & Gregory, wherein it is charged that the very same Kleen-Seal "nipple", "fitting" or grease-cup is the grease-cup, "fitting" or "nipple" of Boker Patent No. 1,802,700, and constitutes an element in the infringement of that more recent patent.

Similarly, in Equity suit No. 85-7 in the Southern District of New York, sponsored by plaintiff, and entitled Min-A-Max Co. Inc. v. Red Brown Patch Co., Inc., plaintiff has already obtained a second injunction enjoining, inter alia, the very same Kleen-Seal "nipple", "fitting" or grease-cup here involved, as constituting an element in the infringement of Boker Patent No. 1,802,700.

In plaintiff's Boker suit in Albany, as well as in the Boker suit in New York against Lincoln Engineering Company of Missouri and Smith & Gregory, not only is the headed Kleen-Seal "fitting" or "nipple" charged to constitute an element of the Boker "combination", but indeed, the Zerk fitting 17 of Figure 3

of Zerk Patent No. 1,475,980 (19 F. 2d, 944, 946) is also charged to constitute an element of the Boker "combination".

Thus, Boker took the very *same* grease-cup "17" disclosed in the Zerk Patent No. 1,475,980 of December 4, 1923 (and shown at 19 F. 2d, 944, 946) and reclaimed it broadly in his much more recent patent No. 1,802,-700 of 1931, in so-called "combination" with a different and allegedly improved nozzle. Thus, by distributing enough of the Boker nozzles in place of the Zerk nozzles, a further monopoly of the Zerk grease-cup, "nipple" or "fitting" can be had for the additional life-term of the Boker patent, which does not expire until seven and one-half (7½) years after the expiration of the Zerk patent.

The *same* "fitting", "nipple" or grease-cup is indeed again claimed in so-called "combination" with another coupler improvement in plaintiff's Morris Reissue Patent No. Re. 18,278, now in litigation in the District Court at Chicago (Equity No. 15,536), and also in the District Court at Milwaukee (Equity No. 4957), and perhaps in suits in other districts with which we are not familiar, and as recently as April 9, 1937, plaintiff took a decree against the defendant Barker in Equity No. 15,536 in the Chicago District, enjoining Barker from selling (inter alia) these very same grease-cups, "nipples" or "fittings", under the Morris patent.

The Morris patent does not expire until March 11, 1947, almost four years after the expiration of the Butler patent (although it was filed seven years ahead of the Butler patent). Thus, if plaintiff's contentions are correct, then it may have a monopoly of the *same* grease-cup for the life of the Boker patent and also for the life of the Morris patent.

We submit herewith a copy of the Morris patent Re. 18,278, and have underscored, in blue, in some of the litigated claims, as for instance claims 54, 55, 56, 57 and 61, the grease-cup or lubricant-receiving "fitting" or "nipple", and having similarly underscored this *same* device in the Boker patent.

That is not all, however, because the very *same* grease-cup or lubricant-receiving "fitting" or "nipple" is *again* made an element of another one of plaintiff's still more recent patents, to wit, the Bystricky Patent No. 2,016,809, referred to in Judge Lindley's opinion on rehearing in 16 Fed. Supp. 778, and under which plaintiff is manufacturing its Alemite-Hydraulic couplers here involved. We submit herewith a copy of the Bystricky Patent No. 2,016,809, and have underscored (in blue) in each of the claims of this patent, the *same* grease-cup or lubricant-receiving "fitting" or "nipple". If plaintiff-appellee's contentions are tenable, then indeed plaintiff now has a monopoly of the very *same* grease-cups or lubricant-receiving "nipples" or "fittings" (accused in the case at bar) not only for the life of the Butler patent here in suit, but for the life of the Bystricky patent which does not expire until October 8, 1952, more than *nine* (9) years after the expiration of the Butler patent.

Nor indeed is plaintiff the only one to have followed in the now condemned footsteps of Gullborg, and claimed a new coupler in so-called "combination" with the old grease-cup, "fitting" or "nipple".

For more than two years now, the very *same* grease-cup, "fitting" or "nipple" accused in the case at bar, is also accused (in precisely the *same* manner) as constituting contributory infringement of Jacques Patent No. 1,383,306, of which a copy is hereto attached, similarly marked in blue. Thus, in three different Districts, suits have been pending for the past two years,

and are now awaiting trial, in which this *same* grease-cup, "fitting" or "nipple" is charged to constitute an element of a so-called "combination" with Jacques' coupler:

Jacques v. Lincoln Engineering Co., Equity No. 11,334 in the Eastern District of Missouri (Eastern Div.);

Jacques v. Universal Lubricating Systems, Equity No. 3043 in the Western District of Pennsylvania;

Jacques v. General Motors Corp., Equity No. 6808 in the Eastern District of Michigan (Southern Div.).

Thus, while in the case at bar, the Butler patent is asserted against defendant's accused grease-cups, "nipples" or "fittings" because such grease-cups, "nipples" or "fittings" are useable with Butler's coupler, in the three contemporaneous suits hereinabove referred to on the Jacques patent, the same grease-cups are similarly accused because useable with the *earlier*-invented and *earlier*-patented Jacques coupler; Butler merely perpetuating the same grease-cup monopoly after the expiration of the Jacques patent No. 1,383,306.

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April 28, 1931. V. A. BOKER 1,802,700

NOZZLE FOR LUBRICATING SYSTEMS

Filed Sept. 9, 1929

Fig. 2

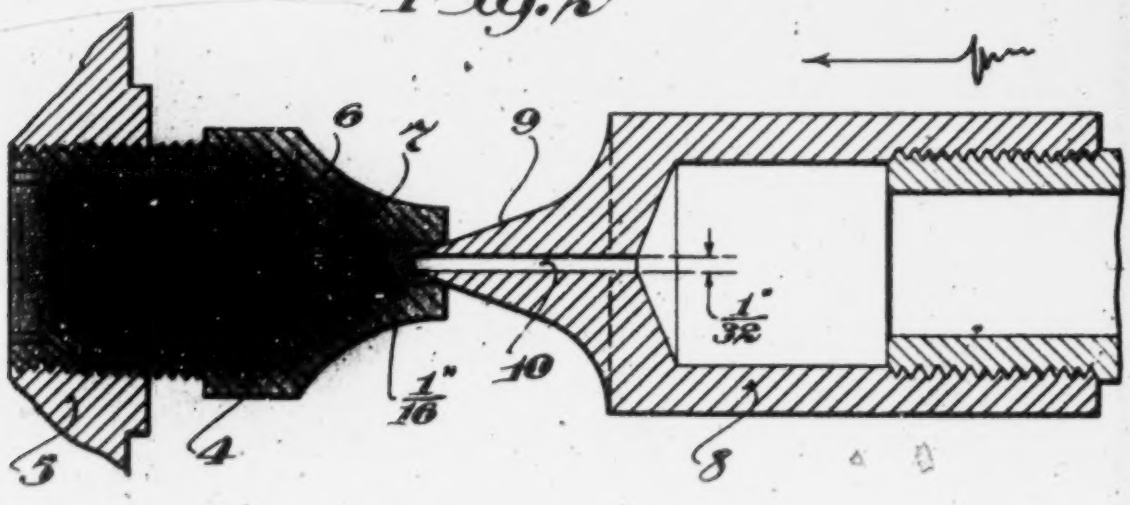


Fig. 1

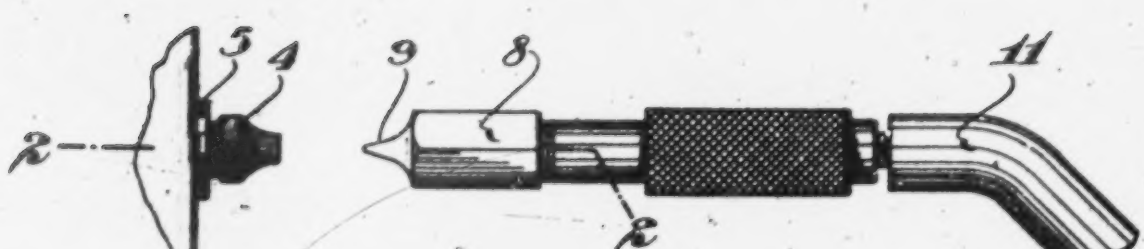
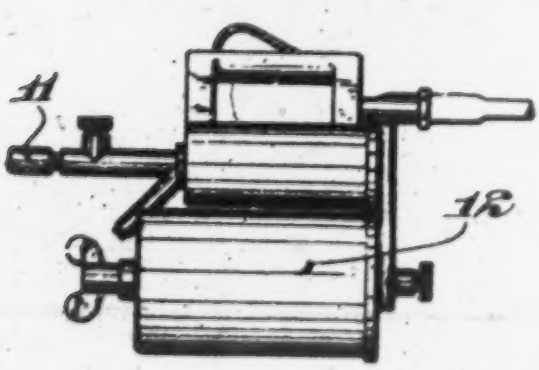


Fig. 3



Inventor
Vitus A. Boker
By his Attorneys
Church & Tilson

Patented Apr. 28, 1931

1,802,700

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UNITED STATES PATENT OFFICE

VITUS A. BOKER, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO MIN-A-MAX CO., OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MINNESOTA

NOZZLE FOR LUBRICATING SYSTEMS

Application filed September 9, 1929. Serial No. 391,228.

My present invention relates to lubricating devices such as used for forcing grease under a high pressure to the journals, bearing and other parts of automobiles, and provides certain highly improved features hereinafter described and defined in the claim.

Devices or apparatus of the character above indicated comprise nipples on the parts to receive the lubricant and high pressure grease guns having discharge nozzles detachable and engageable with the nipples at will in the grease or lubricant delivery action. For efficient lubrication it has been found that the grease guns should be of a character to produce pressures from five to ten thousand pounds per square inch. Certain types of such lubricating apparatus provide for an interlocking engagement between the nipples and nozzles and in such apparatus the interlocking engagement will hold the nozzle to the nipple under high pressures. Interlocking nozzles and nipples require considerable careful manipulation to affect the interlocking engagement and in many places, this is very difficult to accomplish, and in all cases requires more time than would a simple pressure engagement. Hence, there has been provided other types in which engagement of the nozzle with the nipple is accomplished simply by straight-line pressure, but in such devices it has been found difficult even under pressures considerably less than five thousand pounds per square inch, to maintain grease-tight contact between the nozzle and nipple simply by hand pressure which is the only practical way of maintaining such contact, and under higher pressures say, for example, eight thousand pounds per square inch, it has been practically impossible to maintain such grease-tight contact, and the reason for this has been as follows:

It is, of course, a fact that the pressure tending to separate the nozzle from the nipple under the grease-delivery pressure and which pressure must be overcome by the hand pressure, is found by multiplying the area in square inches of the contact circle or line of engagement between the nozzle and nipple by the pressure per square inch on the grease or lubricating material. Hitherto the smallest area of contact line between the nozzle and nipple which has been employed has been that of a circle of approximately one-quarter inch in diameter, and the area of which is approximately the decimal .0491 and this multiplied by eight thousand, the assumed pounds per square inch in the oil pressure, gives a pressure of 392.8 pounds in force tending to separate the nozzle from the nipple and which pressure will have to be overcome to hold the nipple seated in the nozzle. It is thought to be obvious, and in fact has been found to be impossible or impracticable by hand pressure which should simply be pressure from one hand delivered on the nozzle, to overcome any such back pressure on the nozzle.

I have found, however, that this serious defect in the hitherto used nozzle and nipple structures may be overcome by reducing the area of circle or line of contact between the nipple and nozzle to one-sixteenth of an inch or to substantially that dimension or less. The result accomplished by this reduction is made obvious by the following figures. The area of a circle of one-sixteenth of an inch diameter is represented by the decimal .00308 and this again multiplied by the eight thousand, the assumed grease pressure, gives 24.64 pounds in force tending to unseat the nozzle from the nipple. Obviously, this small pressure of less than twenty-five pounds, can be very easily and practically overcome in seating a nozzle with one hand and by this expedient I made it possible, in practice, to use simply pressure-seated nozzle and nipple structures capable of quick and easy manipulation by one hand of an operator in connection with very high pressure grease guns.

In the use of small pointed nozzles for coupling nipples having capillary or very small grease-receiving passages, it is difficult to quickly effect the proper engagement between the two and hence, as an important feature I provide the nozzle with a surrounding aligning sleeve that is engageable with the nipple to direct the point of the nozzle into the grease-receiving passage of the nipple but which does not have contact with the nipple when the nozzle is properly seated.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a plan view with some parts broken away illustrating a nipple and nozzle structure of the character above indicated;

Fig. 2 is a section on the line 2—2 of Fig. 1; and

Fig. 3 is a plan view illustrating a high pressure grease gun that may be used as a part of the lubricating device or apparatus.

Attention is called to the fact that Fig. 1 shows a nozzle and nipple in substantially actual scale whereas Fig. 2 shows the nozzle and nipple on a very greatly enlarged scale. The nipple 4, as shown, is screwed into the member 5 that is to receive the grease or lubricant from the nipple. The nipple, as shown, is provided with the cutomary inwardly-opening check valve 6. The nipple 4 is provided with the above indicated very small grease-receiving conduit or passage 7 that has a diameter of one-sixteenth of an inch or even less. The nozzle 8 is provided with a straight-line tapered delivery end 9 having an axial passage 10 with approximately one-thirty-second of an inch in diameter. The point of the end 9 tapers to a diameter considerably less than one-sixteenth of an inch preferably to approximately one-thirty-second of an inch in diameter so that it will readily enter the passage 7 of the nozzle.

The nozzle 8 by a flexible grease-delivery pipe 11 is connected to a grease gun of suitable construction indicated as an entirety by the numeral 12. This grease gun is of a type that will produce pressure of from five to ten thousand pounds per square inch and it may be assumed to be a grease gun of a type disclosed and claimed in my co-pending application.

Inasmuch as the nozzle passage 7 is cylindrical at its outer end portion, and hence, is a true circle, and since the tapered end 9 of the nozzle is truly conical, it, of course, follows that the nozzle and nipple must be in substantially axial alignment to produce perfect and complete contact between the nozzle and nipple in the grease-delivery end.

In actual practice, the advantages above set forth in respect to the device constructed in accordance with my invention, has been thoroughly demonstrated and it has been found that it is a very easy matter to maintain grease-tight contact between the nipple and nozzle under the very high pressures above indicated, simply by holding the nozzle in one hand and pressing the same with comparative ease against the nipple. In setting forth the features above discussed, it should be borne in mind that it is not primarily the size of the grease-delivery conduits, but the diameter of the circular line of contact between the nozzle and the nipple which, multiplied by the grease pressure, determines the force tending to separate the nozzle from the nipple.

What I claim is:

The combination of a grease-receiving nipple having a nozzle-receiving aperture therein not materially more than one-sixteenth of an inch in diameter, of a grease delivery nozzle, having a substantially uniformly tapered conical tip and also having a nozzle aperture axially through said tip, the latter being so tapered as to approach adjacent its end the diameter of said nozzle aperture, and to be operatively wedged within the nozzle-receiving aperture, whereby the tip may be held within the nozzle-receiving aperture by manual pressure under grease injecting pressures of approximately 8000 lbs. per square inch without leakage around the nozzle-receiving aperture.

In testimony whereof I affix my signature.

VITUS A. BOKER.

The grease-cup or so-called "lubricant receptacle element" 17 of Zerk patent 1,475,980 (19 Feb. 24 944,946)

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Dec. 8, 1931. W. L. MORRIS Re. 18,278

GREASE FEEDER

Original Filed Aug. 7, 1916 3 Sheets-Sheet 1

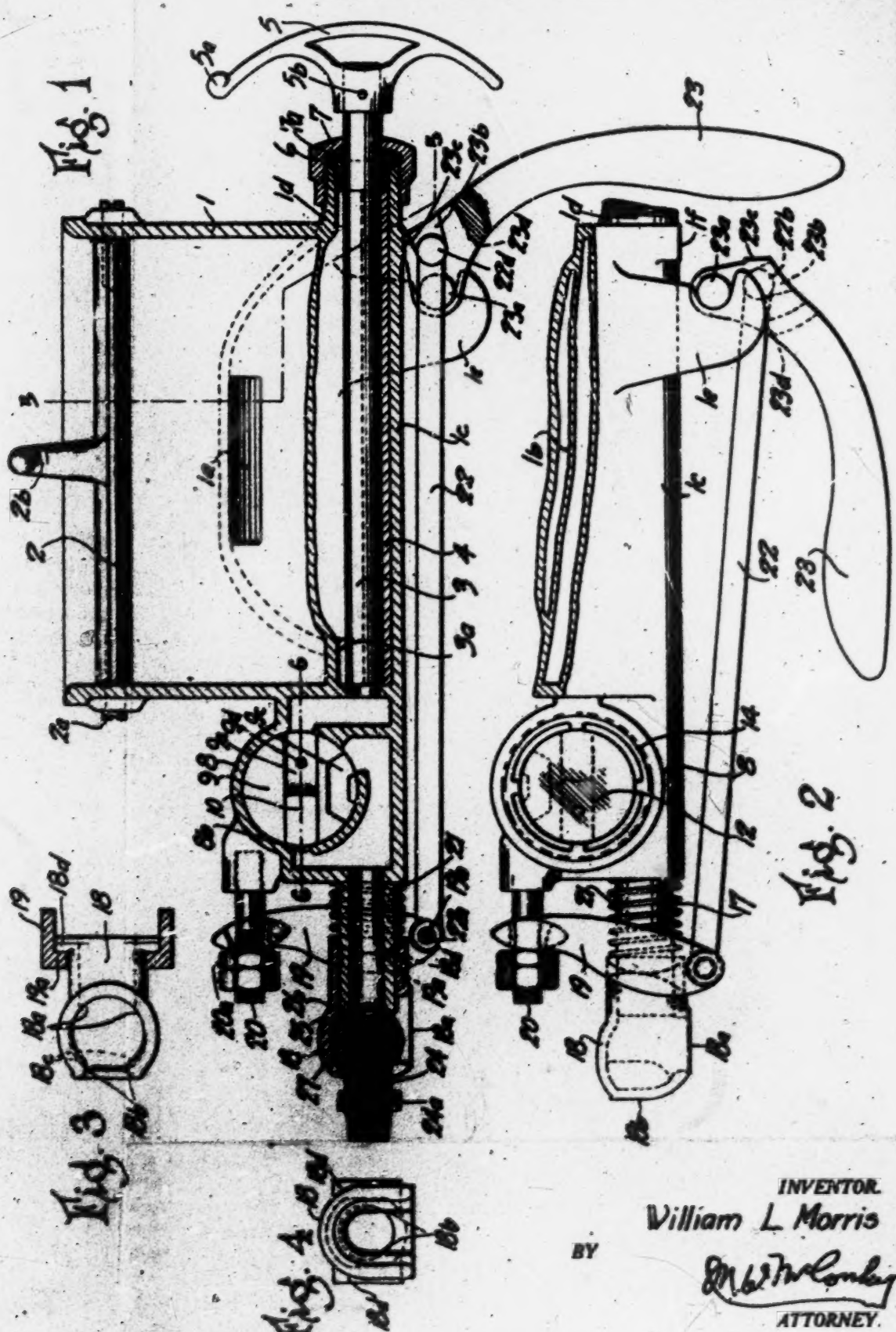

Fig. 1

Fig. 2

Fig. 3

Fig. 4

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Dec. 8, 1931. W. L. MORRIS Re. 18,278

GREASE FEEDER

Original Filed Aug. 7, 1916 3 Sheets-Sheet 2

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Dec. 8, 1931. W. L. MORRIS Re. 18,278

GREASE FEEDER

Original Filed Aug. 7, 1916 3 Sheets-Sheet 3

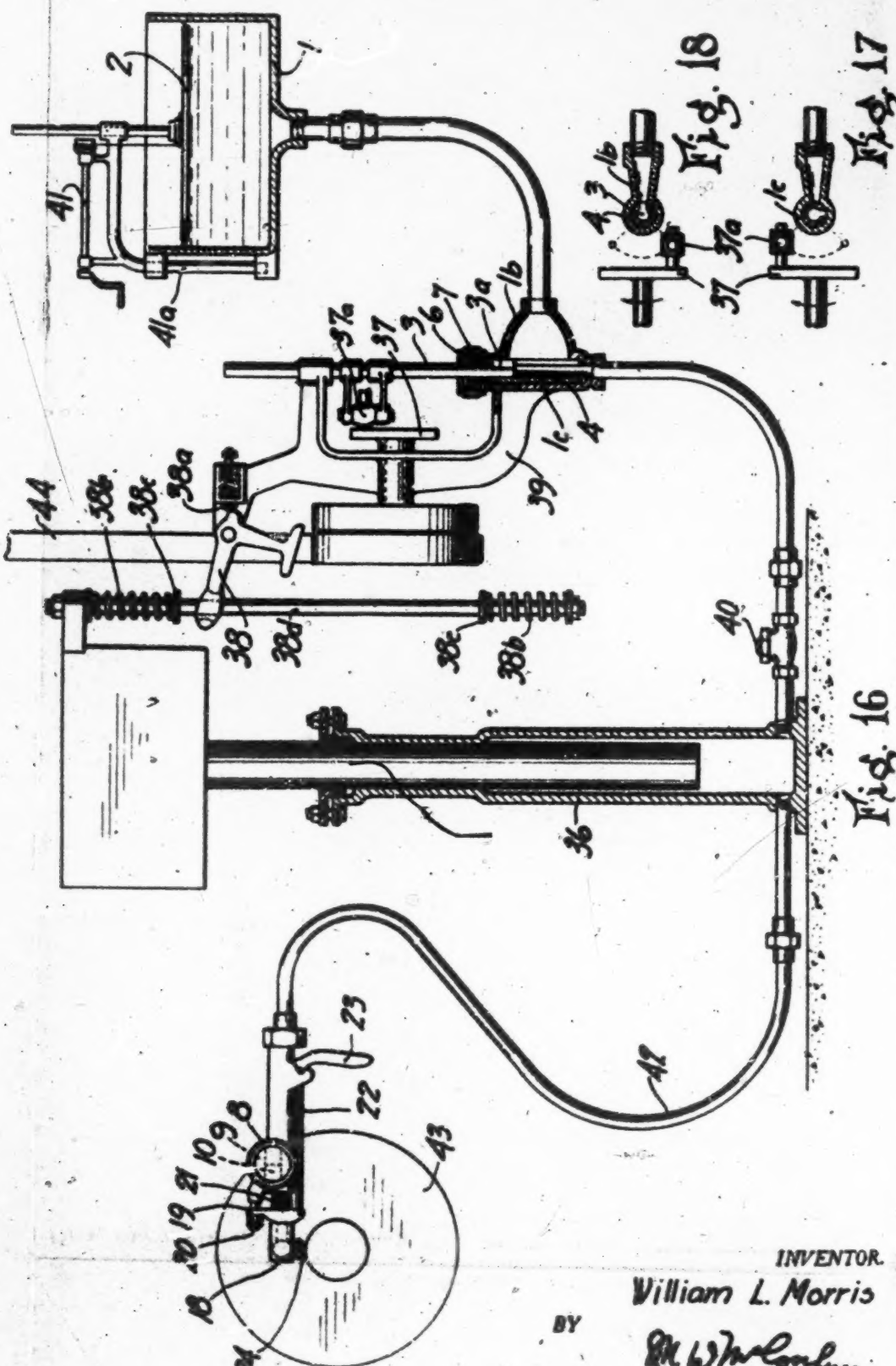

Fig. 16

Fig. 18

Fig. 17

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Reissued Dec. 8, 1931

Re. 18,278

683

UNITED STATES PATENT OFFICE

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GREASE FEEDER

Original application filed August 7, 1916, Serial No. 113,653, Patent No. 1,748,830, dated March 11, 1930. Divided and application filed May 5, 1928, Serial No. 275,540. Original No. 1,756,657, dated April 29, 1930. Application for reissue filed March 20, 1931. Serial No. 524,190.

This application is a division of my application Serial No. 113,653, filed August 7, 1916, for grease feeders.

This invention relates particularly to a grease feeder for filling the grease cups of an automobile but of course it may have a more general application wherever it may be used. The principal object of the invention is to provide a grease feeder with which the grease cups or devices may be filled without any loss of grease and in the quickest possible time.

A successful grease feeder should be able to accomplish a number of important results; it should be of such construction that a central system could be employed feeding grease from a pipe line under pressure or a hand operated system, both of which can be easily and quickly attached and successfully used. A central system should be able to fill four or five grease cups a minute; a hand system should be able to fill two or three cups per minute. Either the hand or the pressure feed should be arranged to feed a predetermined amount at each feeding; the central system at about 200 pounds pressure, the hand system at about 50 to 75 pounds pressure, both systems having means of showing whether the grease has been fed. Any feeder should have such a construction that grease is prevented from oozing out when disconnected from the grease cup due to the air re-expanding, and there must be no pressure at the discharge connection when the grease feeder is detached. The connection to which the grease feeder is attached should permit of connection from any one of several angles on account of the many positions in which cups are placed on a car. The form of grease feeder should be such that an exact alignment of the feeder is not necessary in order to make the connection; the form of grease feeding connection should be one which will permit a considerable movement of the grease feeding device without imposing too great a strain on the small connections of the grease cups. The attachments for the grease cups should be uniform in size so that the feeder can readily be attached thereto regardless of the size or make of the grease cup itself. These are only a few of the requirements for a successful grease feeder and the present device is believed to answer all these requirements and many others as will hereinafter be set forth.

The invention consists in the features of novelty in the construction, combination, and arrangement of the several parts.

In the accompanying drawings, Figure 1 is a longitudinal section taken on the line 1—1 of Figure 5; Figure 2 is a view in elevation of the lower part of the construction shown on Figure 1; Figure 3 is a view looking at the under side of the movable clamp member; Figure 4 is an end view of the movable clamp member; Figure 5 is a transverse section taken on the line 5—5 of Figure 1; Figure 6 is a plan section of the measuring device taken on the line 6—6 of Figure 1; Figure 7 is a perspective of the rotatable measuring member and its transversely movable plug; Figure 8 shows the measuring device of Figure 7 with its by-pass in communication; Figure 9 is a perspective of the hand plunger; Figure 10 is a perspective of a rotatable sleeve valve; Figure 11 is a cross sectional view through the plunger and sleeve when the grease port is shut off; Figure 12 shows one grease plug attachment; Figures 13 and 14 show other forms of grease plug attachments at different angles; Figure 15 is a diagrammatic view illustrating grease handling by suction; and Figures 16, 17 and 18 are views showing a power grease feeder.

This device is intended to store a quantity of grease and then deliver it in small quantities to different bearings or grease cups, and instead of the grease storage being in each of the several grease cups which must be screwed down to feed the grease, the storage is in the feeder. Also, instead of feeding grease from the grease cups by manipulating them and refilling them when empty, this device is attached directly to the bearing to be supplied with grease and the grease is fed from it, the grease feeder being refilled instead of the cups. It is difficult to feed grease slowly and automatically for a considerable time, particularly with a device like the ordinary grease cup and it is for such bearings as require only a small amount of grease that this device is particularly suited. Grease cups

become fouled with dirt and impurities so that they are difficult to manipulate and when there are many cups there is much labor involved in adjusting and filling them. Another purpose of this device is to save labor, however it will also save grease and avoid admitting much of the dirt and impurities that get into separate grease cups. This feeder can be quickly attached, the grease forced to the bearing, and the feeder detached. The various details employed are chiefly for the purpose of saving labor.

This feeder comprises an attaching device, a grease feeding mechanism, a quantity measuring mechanism, and a grease storage and suction feeding mechanism. In some cases the entire combination of devices is necessary, while in some other cases a power pump may be used to supply grease under pressure in connection with the attaching and measuring mechanisms.

Grease is a peculiar substance to handle and until its characteristics are pointed out, the new and novel details employed in this devices will not be sufficiently appreciated. Grease being a solid or rather a semi-solid, more or less plastic, will not flow unless it is forced by pressure. If suction is applied to a chamber or receptacle containing grease, air will pass through the grease where there is the least resistance. If air is prevented from entering at the point of least resistance then the suction will be greatest at this point and by increasing the length of travel that the air would have to take, the greater will be the suction at points of least resistance which are covered actually to prevent air from entering. This may be more clearly shown by referring to Figure 15 in which the disk D is forced down on the grease in a suitable receptacle to exclude air from the mass of grease so that the pressure per unit of area at the point A would, when suction is applied to the outlet E, be much greater than necessary to move the grease, gradually becoming less at the point B and the lowest possible pressure at the edge of the disk C; really less than that required to move the grease. Stating this a different way, it is the combined pressure on the entire disk D caused by the suction that is sufficient to withdraw the grease, but the pressure at the edge of the disk is too low for air to pierce thru the body of the grease. Thus, although the grease may be almost entirely removed from such a receptacle by suction, the length of travel of the air thru the grease would be so great that more pressure would be required to puncture thru the grease than to withdraw it from the suction opening.

Another consideration in handling grease is the difficulty of keeping air out of the grease container; such air as would be encircled or pocketed by grease while placing it in the container. When air and grease are confined together the measuring device will not measure accurately; furthermore, the pockets of air re-expand when suction and pressure are alternated, and when detaching the feeder from the bearing the compressed air may eject grease at the connecting fittings. The shallower the container and the larger its filling opening, the less air will be pocketed while filling the container with grease. It is further desirable to employ the form shown to serve this valuable purpose for the form of the container makes it possible to insert or fill it with grease without pocketing air, the form and shape of the lid or cover making it practicable to suck grease from the container without air piercing thru the grease. This device also relieves pressure on the grease at the point of connection before disconnecting therefrom.

In feeding grease to different bearings some will require much pressure to force it into the bearings while others will require very little pressure. When only a small amount of grease is to be supplied no hand opening or closing of a valve or hand control of the amount of movement of the grease forcing ram can be relied upon to measure out a predetermined quantity of grease. It requires a device that will measure in cubical contents at any pressure or velocity, positively closing when the predetermined amount has been measured.

To prevent grease from escaping at the connecting members it is necessary to have a self closing valve so that any confined pressure in the bearing will not eject grease when the parts are separated, or when the joint is disconnected. The pressure at the grease feeder connection, that is, at the end of the feeder itself should first be below atmospheric pressure to prevent the grease from escaping from the open end of the feeder and the feeder should then be opened to the atmosphere before disconnecting it; this insures that the pressure is not above the atmosphere so it will discharge grease, and at the same time not enough below the atmospheric pressure to draw grease back into the feeder and allow air to enter which might be forced into the next bearing filled. It has been shown in practice that the feeder herein shown and described will do all of the above things and answer all of the requirements for a successful grease feeder.

In the accompanying drawings the numeral 1 designates generally the grease receptacle having the form shown in cross section in Figure 5 throughout its entire length as shown in Figure 1. This grease receptacle has an opening 1^a thru which grease is sucked from the receptacle, the sides of the opening being spaced from the points where air may enter, approximately the same amount or distance in all directions. The resistance against air leakage is made as near the maxi-

mum as possible for all points. From the opening 1^a a passage 1^b extends forming the grease inlet to the cylindrical port on 1^c of the receptacle casing. A lid or cover 2 is pivoted at one side of receptacle 1 on a pivot 2^a and serves a far more valuable purpose than merely to keep dirt out of the grease receptacle. The cover or follower is pressed down firmly on the grease after the receptacle has been filled thereby forcing air and some grease outwardly around the edges but leaving the contents of the receptacle solid grease from which air has been excluded with the cover bearing firmly upon it. A handle 2^b affords means for raising and lowering the cover which is shown in Figure 5 by the dotted outlines 2^c in its raised position and by the dotted outline 2^c in almost its lowest position.

Rotatable in a cylindrical portion 1^c of the feeder casing is a valve sleeve 4 having a longitudinal slot 4^a which extends its entire length. In this sleeve a ram or plunger 3 is movable which has at one end a block 3^a adapted to fit in the slot 4^a so that the outer radius of the block is the same as that of the sleeve. The plunger can therefore be moved longitudinally without moving the sleeve and when the plunger is rotated the sleeve rotates also. At the other end of the plunger is a handle 5 flat at one side but having a distinguishing scroll 5^a on the other to designate the position of the port in the sleeve valve 4. This handle is secured to the plunger by a pin 5^b. At the outer end of the plunger is a retained gland 6 positioned close to the outer end of valve sleeve 4, allowing only enough clearance so that the sleeve will rotate. This gland is formed with a shoulder to prevent its being pressed in against sleeve 4 and a packing nut 7 with interposed packing 7^a prevents leakage around the gland and retains the plunger and the sleeve 4 in place. In operation the plunger 3 can be withdrawn until the block 3^a comes in contact with the gland 6. The boss 1^d to which the gland and packing nut are attached is shown as an integral part of the receptacle 1. The bore at the discharge end of the cylinder is sufficiently smaller than the diameter of the valve sleeve 4 to provide a shoulder against which this end of the sleeve abuts and rotates and also form a stop against which the inner end of piston 3 may contact to limit its travel in this direction.

The casing of the measuring device is designated generally by the numeral 8 and may be a separate and distinct part attached to the receptacle 1 instead of an integral part as shown in Figure 1. In this casing 8 is a bore in which a rotatable member 9 is movable. This member 9 has a slot 9^a into which the grease passes to be measured, and a measuring block 10 slidable therein, the length of the block determining the amount of grease to be ejected with each half turn of the member 9. The stem 9^b extends to the outside of the measuring device to permit movement thereof. To this stem a handle 11 is attached by means of a pin 11^a, with a lower extremity 11^b adapted to make contact with stops 8^a projecting from the casing.

In front of the rotatable member 9 is a glass disk 12 against which the rotatable member 9 is pressed by means of a spring 13. The glass disk is held in place with a retaining ring 14 and made tight with packing rings 15. The stops 8^a at the back of the measuring device are so placed that the lever 11 can be turned half way and back again to make the ends of the slot 9^a register with openings in the casing 8 for discharging the grease. A packing nut 16 and packing 16^a prevents leakage around the stem 9^b. This measuring device has a by-pass 9^c whereby the grease which passes through need not be measured. This by-pass port 9^c can be turned to the position shown in Figure 8, thereby shutting off the port or slot 9^a. In releasing the lower end 11^b of the lever 11 from engagement with stops 8^a, the rotatable member 9 is moved away from the glass disk 12, compressing the spring 13 and allowing the end 11^b to ride on top of the stops 8^a until the position shown in Figure 8 is reached. If this position is to be maintained for some time, the stops 8^a would be notched at the by-pass position so that the rotatable member 9 will be locked in this position and allowed to return to its normal position against the glass 12. In the bottom of the slot 9^a of this member 9 are holes 9^d for relieving pressure between the rotatable member 9 and the casing 8 when the rotatable member is drawn back to disengage its handle from the stops.

When the floating piston or plug 10 is at one end of the slot 9^a as shown by Figure 1, it closes a discharge passage 8^b; the piston is larger than the passage and closes over it tightly, much the same as a check valve. In Figure 2 the rotatable member 9 is turned half way around with the piston or plug 10 in the same position in slot 9^a, as it was in Figure 1 and ready to take its travel of a stroke and eject as much grease as lies between the piston and discharge passage 8^b. The glass sight 12 shows clearly the position of the piston, at all times, and whether grease has traveled through the measuring port, and also shows if air is in the charge of grease. The quantity of grease discharged each stroke can be varied by varying the length of the floating or reciprocating piston 10.

At the discharge end of the measuring device casing is a nozzle 17 in communication with the passage 8^b and with the discharge from the by-pass 9^c so that either a measured or unmeasured quantity of grease can be discharged therefrom. Slidable on this nozzle is a clamping member 18 which has an attach-

ing extremity 18^a open from below and a reduced opening 18^b at the end shown by Figures 3 and 4. These openings are proportioned to receive a spherical end of a ball fitting 24 as shown in Figure 1, so that the fitting may be clamped between the member 18 and the end of nozzle 17, a spherical bearing face 18^c being formed in the clamping member as shown in Figure 3 and the end of the nozzle 17 having a spherical seat.

Extending from the clamping member 18 are ears 18^d as shown in Figures 1, 3 and 4 by which the member may be pulled toward the nozzle 17. A pull lever 19 has legs 19^a which bear against the ears 18^d, the lever being like an inverted U with the upper end loosely engaged by the stud 20 upon which are adjusting nuts 20^a. The ears 18^d (Figure 4) fit between the legs of the lever 19, which extend down over the nozzle 17 and are provided at the lower ends with holes through which a pin 19^b extends. Ears 18^d are straight sided and may engage the inner sides of the legs of the lever 19, thereby preventing the clamping member from rotating out of position. For nearly all connections, the clamping members 18, 19, 22 and 23 bear only on one side of their bearing and a spring 21 is therefore placed at the nozzle end of the clamping member tending to keep bearings in contact. These connections can be made with full bearings at 23^a and would bear against the opposite sides of the different bearings dispensing with the spring, but this would not be as satisfactory as the construction shown.

A link or pull rod 22 has a long eye 22^a at one end, through which the pin 19^b extends, and the other end 22^b is T-shaped, forming a bearing part at each side. An operating lever 23 is formed with a pivot leg 23^a at each side, which has a bearing in recesses of legs 1^c, preferably formed integrally with the bottom of receptacle 1. In this lever 23 are bearings 23^b for the T-head extremities 22^b of link 22, so that the movement of the lever 23 carries the T-head past the line through the center of the eye 22^a of the pull rod and the bearing 23^b of the lever, until a shoulder 23^c of the lever 23 abuts a stop or projection 1^f on the bottom of the receptacle. The limit of travel in the other direction is determined by the engagement of a shoulder 23^c of the lever with the pull rod 22, as clearly shown in Figures 1 and 2.

An end ported fitting 24, clearly shown in Figure 1, has a threaded connecting end and a hexagonal portion 24^a for attaching it. In the port is a ball valve 25 pressed against a valve seat 26 by a spring 27. The seat 26 is inserted and held in a [illegible] formed about the opening into the fitting. In Figures 13, 14, and 15 different forms of ball fitting are shown; the port of the ball or spherical fitting 29 is as the ball in Figure 12 the numeral 29 designating generally a pin or bearing for receiving lubricant, with a grease cup end 29^a threaded into a fitting end 29^b; in Figure 13, a member 30 is similar to the fitting shown in Figure 1 with the exception that the port is at 45 degrees to its longitudinal axis. In Figure 14 the ball fitting 31 has a port at a special angle, and has its lower end secured to a standard grease cup cap 32, the stationary part of the grease cup being designated as 33. In this last structure is a formed valve 34 having a pointed spring 35 bearing inside of the valve.

These modified forms are shown as they can all be used with a clamping device, the spherical form being superior to others, as it allows connection from almost any angle, and is easily cleaned or wiped off. Furthermore a slight movement of the grease feeder is permissible with the spherical connection without placing a strain on the fitting; the clamping member will slip on the ball up to a point such that it bears on the neck; the neck however, would be considerably smaller than the opening 18^b shown in Figure 4.

In operation, the cover 2 is raised to the position 2^d and, with a small paddle or putty knife, grease is placed in one side of receptacle 1, and as more is added and squeezed down into the receptacle, it is filled from one end to the other. This method of filling expels the air. When the receptacle is full, the cover is forced down firmly, squeezing out the top air together with some grease. The surplus grease is cut away with the putty knife and put back into the grease pail or barrel and the feeder is ready to use after first taking a stroke with the plunger 3 and discharging grease back into the pail to see that the grease is filled in solidly.

With a rag in right hand to wipe off outer end of attachments, and filler in left hand, the clamping member 18 is placed over a spherical connection and the clamp lever 23 is pulled up to its stop with the left hand. With the right hand the grease is drawn into the sleeve 4 by moving plunger 3 outwardly and with the scroll on handle 5^a, standing up. At the end of the outward stroke the handle 5 is turned half way around with the scroll at bottom which closes the longitudinal port 3^a, and the plunger is moved in, forcing grease from the sleeve into the measuring device. To disconnect, the lever 23 is pushed back with the left hand and clamping member 18 is disengaged ready to fill the next bearing.

If the measuring device is being used, then while going from one bearing to the next, the handle 11 is turned half way around against its other stop 9^a. The grease will hold the cover 2 firmly by suction so it will not open even when placed upside down. When the receptacle is empty, the increased resistance will be noted when pulling out the

plunger as the cover 2 would be at the end of its travel. Where much grease is to be handled, the plunger and receptacle would be stationary and much larger with flexible metallic hose run to the measuring and clamping device. The pump in this case would be power driven with a weighted accumulator arranged to cut out the pump drive when full and then throw it in when nearly empty, as shown by Figures 16, 17 and 18.

If a central service station system is used with a power pump to discharge the grease, the grease cups under the car, such as for brakes, rear axle swivel, universal joint, and the like, should point to such a position that a man in a cleaning pit beneath the car would find them easy of access. A piped pressure system for discharging grease requires a pump to create a pressure of about 200 pounds.

Grease cannot be readily placed in the small end of a long container, and when so placed, air is apt to be confined between each application of grease, while it is being pressed in. A shallow container with a large opening can be filled much more readily and air kept out entirely if grease is carefully placed so that a volume of air is not pocketed with the grease.

Where a certain movement, such as the travel of a ram determines the amount of grease fed, possibly no other device would be necessary. With either the hand or power form the measuring device should have a by-pass to permit an unmeasured quantity of grease to be discharged.

That part of the feeding device which is connected to the grease receiving projection or fitting should be of such construction that it can be quickly attached and detached, preferably by lever manipulation, as shown, rather than by a screw, and when the lever is drawn up tight it should hold to the fitting even if the hand is removed, for in the manipulation of the grease feeding plunger with one hand, the other would be unsteady, relieving pressure at the connection and allowing a leakage. The clamping device should have a limit to its clamping and releasing travel to avoid unnecessary strain on the parts. A wear take-up is required so that if there is not sufficient tension it can be readily adjusted, and when so set will not shift out of adjustment. The attachments are accurately made to an established form with very small allowance for variation. The adjustment of the clamping device is used to take up the wear in the parts, not to cover inaccuracy or variations in the parts. The present invention fulfills all of these requirements.

Although the feeder nozzle is rigid, great flexibility in use is obtained by the variable angle of attachment which is made possible by locating the port holes at various angles on the grease receiving fittings. This flexibility is different and separate from that produced by a flexible conduit but it enables an operator to engage fittings and to avoid obstructions which would otherwise be difficult of access.

I claim:

1. A grease feeder for detachable connection to a grease receiving bearing having a feeder projection comprising a slotted socket for making a detachable connection with feeder projections from a plurality of positions in different planes.

2. A lubricant feeder for a plurality of lubricant using bearings, each bearing having a projection with a port hole therein, and the port holes of different projections being located at various angles with the axis of the projection, comprising means for detachably and positively connecting the feeder to each of said projections so that the feeder will register with the port of said projection.

3. A lubricant feeder for detachable connection to a bearing for receiving lubricant, said bearing being provided with a lubricant receiving member having a round tip with a port opening therein in any one of a plurality of angles, and means for attaching the feeder to said round tip at an angle to communicate with the port thereof.

4. A grease feeder for a means for receiving grease having a ported spherical projection with a grease admitting port at any location on the sphere comprising a discharge nozzle and a connector movable relative to the nozzle and having an extremity adapted to fit over a spherical projection to connect the port thereof with the discharge nozzle.

5. A lubricant feeder for a mechanism having a plurality of bearings each provided with a ported projection in which the apertures to the ports are at different angular positions and in different planes relative to one another and having like contours of connecting faces at different port locations comprising, a feeder nozzle, and means in connection with the feeder nozzle for universally connecting it with a ported projection in any one of the different positions to register with the apertures thereof.

6. A grease feeder for detachable connection to a ported receiving device comprising means forming a spherical joint face adapted to be movably connected between the feeder and a receiving device to permit alteration in alignment of the feeder port in relation to a receiving device port, and mechanical means for holding the joint face of the feeder in contact with the receiving device.

7. A lubricant feeder for detachable connection to a ported receiving device comprising a spherical joint face to permit relative angular movement, and means for holding the joint face in contact with a receiving device to permit relative movement but in-

suring a tight joint bearing on the spherical surface.

8. A lubricant feeder for detachable connection to a bearing having a ported feeder connection member comprising means forming a spherical joint face between the feeder and a connection member with a port within the joint face, and a contact ring having a port therein, and means for holding the faces in contact through a range of varying angular positions with respect to the port openings within the ring of contact.

9. A lubricant feeder for a mechanism having a plurality of bearings each having a ported projection the axes of different ports in different projections being disposed at different angles with respect to the general axes of the projections, the projections having like contours of connecting faces at different port locations, comprising, a feeder nozzle, and means in connection with the nozzle for universally connecting it with a ported projection in any of the different positions to register with a port thereof.

10. A lubricant feeder for a mechanism having a plurality of bearings, each provided with a ported projection, each projection having a body portion, the port apertures of different projections being at different relative angular positions and in different planes with respect to the body portions of the projections, said projections having like contours of connecting faces at different port locations, comprising, a feeder nozzle and means in connection with the feeder nozzle for universally connecting it with any ported projection in register with the aperture thereof.

11. In a coupler for quick-detachably connecting a lubricant source with a ball-headed fitting, inner and outer sleeve members, the outer sleeve member adapted at one end to project beyond the corresponding end of the inner sleeve member and having a shoulder adapted to engage a portion of the ball-head of a fitting, the inner sleeve having a concavely spherical seat about its said corresponding end for engaging the ball-head of the fitting, said shoulder and seat being substantially oppositely directed for reception of the ball-head of the fitting therebetween, said sleeves being relatively slidable, and means for urging said shoulder and seat relatively toward one another.

12. In a coupler for quick-detachably connecting a lubricant source with a ball-headed fitting, inner and outer sleeve members, the outer sleeve member adapted at one end to project beyond the corresponding end of the inner sleeve member and having a shoulder adapted to engage a portion of the ball-head of a fitting, the inner sleeve having a concavely spherical seat about its said corresponding end for engaging the ball-head of the fitting, said shoulder and seat being substantially oppositely directed for reception of the ball-head of the fitting therebetween, and means for urging said shoulder and seat relatively apart and relatively toward one another.

13. A coupler for quick-detachably connecting a lubricant source with a ballheaded fitting comprising inner and outer sleeve members, the outer sleeve member adapted at one end to project beyond the corresponding end of the inner sleeve member and having a shoulder adapted to engage a portion of the ball-head of a fitting, the inner sleeve having a concavely spherical seat about its said corresponding end for engaging the ball-head of the fitting, said shoulder and seat being substantially oppositely directed for reception of the ball-head of the fitting therebetween, means for urging said shoulder and seat relatively apart, and means for urging said shoulder and seat relatively toward one another.

14. A coupler for quick-detachably connecting a lubricant source with a ball-headed fitting comprising inner and outer sleeve members, the outer sleeve member adapted at one end to project beyond the corresponding end of the inner sleeve member and having a shoulder adapted to engage a portion of the ball-head of a fitting, the inner sleeve having a concavely spherical seat about its said corresponding end for engaging the ball-head of the fitting, said shoulder and seat being substantially oppositely directed for reception of the ball-head of the fitting therebetween, and means for relatively urging said shoulder and seat toward one another.

15. In a coupler for quick-detachably connecting a lubricant source with a ball-headed fitting, inner and outer sleeve members, the outer sleeve member adapted at one end to project beyond the corresponding end of the inner sleeve member and having a shoulder adapted to engage a portion of the ball-head of a fitting, the inner sleeve having a concavely spherical seat about its said corresponding end for engaging the ball-head of the fitting, said shoulder and seat being substantially oppositely directed for reception of the ball-head of the fitting therebetween, means for urging said shoulder and seat relatively apart and means for urging said shoulder and seat relatively toward one another, one of the last said means being resilient.

16. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and a contact portion surrounding the discharge port formed for a lubricant tight universal engagement with a lubricant receiving element.

17. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and a contact portion surrounding the discharge port such as would be formed by

the rotation of a curved line about an axis whereby to engage a cooperative surface of a lubricant nipple.

18. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and a contact portion surrounding the discharge port such as would be formed by the rotation of a curved line about the axis of said tubular member whereby to engage a cooperative surface of a lubricant nipple.

19. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and an outwardly flared contact portion surrounding the discharge port whereby to engage a cooperative surface of a lubricant nipple.

20. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and a concave contact surface surrounding the discharge port whereby to engage a cooperative surface of a lubricant nipple.

21. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and a concavely spherical contact surface surrounding the discharge port whereby to engage a cooperative surface of a lubricant nipple.

22. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and an outwardly flared contact portion surrounding the discharge port and means for guiding the contact portion into cooperative relation with a lubricant receiving element.

23. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and an outwardly flaring contact portion surrounding the discharge port and means adapted to extend partly around an element to be lubricated and guide the contact portion of the nozzle into cooperative relation therewith.

24. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and a concavely spherical contact portion surrounding the discharge port and means extending beyond the contact portion and adapted to guide it into cooperative relation to an element to be lubricated while allowing relative universal movement therebetween.

25. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and an outwardly flared contact portion surrounding the discharge port formed for lubricant tight engagement with a lubricant receiving element and means for guiding said contact portion into cooperative relation with such lubricant receiving element while allowing universal movement therebetween.

26. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and a concavely spherical contact portion surrounding the discharge port formed for lubricant tight connection with a lubricant receiving element and means for guiding said contact portion into cooperative relation with said lubricant receiving element and maintaining such relation while allowing universal movement therebetween.

27. In a lubricant feeder a nozzle comprising a tubular member having a discharge portion and an outwardly flared contact portion surrounding the discharge portion formed for quick detachable lubricant-tight connection with a lubricant receiving element and a clamp member adapted to extend partly around an element to be lubricated and hold it in cooperative relation with said nozzle while allowing relative universal movement therebetween.

28. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and a concavely spherical contact portion surrounding the discharge port formed for lubricant tight connection with a lubricant receiving element and means including a clamp member formed to fit over a headed nipple at any angle thereto and guide the nozzle into cooperative relation therewith.

29. In a lubricant feeder a nozzle comprising a tubular member having a discharge port and a contact portion surrounding the discharge port formed for quick detachable lubricant tight connection with a lubricant receiving element and means including a clamp member formed to fit over a headed nipple at any angle thereto and hold the nozzle in cooperative relation therewith while allowing universal movement thereof.

30. In a lubricating apparatus, the combination of a receiver and a filler comprising a lubricant reservoir and adapted to be applied to and to fill said receiver, one of said parts presenting a surface which is a zone of a sphere and the other presenting an annular surface cooperating therewith, and means to lock said parts together and to maintain a joint permitting relative turning movement about the center of said sphere, said parts presenting a separable coupling affording a conduit for the lubricant in its passage from said reservoir to said receiver.

31. In a lubricating apparatus, the combination of a receiver and a filler adapted to be applied to and to fill said receiver, said receiver and filler comprising separable coupling members having provision for attachment of one to the other in various angular relations of their longitudinal axes, and means for limiting rotation of one of said members about its said longitudinal axis with relation to the other member.

32. In a lubricating apparatus, the combination of a receiver and a filler adapted to be applied to and to fill said receiver, one of said parts presenting a head and a neck, said head having a surface which is a zone of a sphere, and the other part presenting an annular surface cooperating therewith to maintain a

joint permitting a relative turning movement about the center of said sphere, and means embracing said neck and cooperating with said head to secure such other part thereto.

33. In a lubricating apparatus, the combination of a receiver having a head and a neck presenting a passage extending through said neck and having an inlet in said head; and a filler comprising two members, one adapted to engage said head at top and bottom, respectively, and to telescope relatively to each other in a direction transverse to said neck, one of said members presenting a passage adapted to communicate with said receiver passage.

34. In a lubricating apparatus, the combination of a receiver having a head and a neck presenting a passage extending through said neck and having an inlet in said head; and a filler comprising two members, one adapted to engage said head at top and bottom, respectively, and to telescope relatively to each other transverse to said neck, one of said members having means rendered effective by movement of such member in one direction transversely of said neck to cause said members to clamp said head therebetween, one of said members presenting a passage adapted to communicate with the passage in said receiver.

35. In a lubricating apparatus, the combination of a receiver having a head and a neck presenting a passage extending through said neck and having an inlet in said head; and a filler comprising two members, one adapted to engage said head at top and bottom, respectively, and to telescope relatively to each other transverse to said neck, one of said members having means rendered effective by movement of such member in one direction transversely to said neck to cause said members to clamp said head therebetween, said members presenting passages communicating with each other and one of said members communicating with the passage in said receiver.

36. In a lubricating apparatus, the combination of a receiver having a head and a neck presenting a passage extending through said neck and having an inlet in said head; and a filler comprising two relatively telescopic members having provision by relative telescopic movement transversely of said neck to clamp said head therebetween, and a spring means normally to retain said members in a relative position with respect to their relative telescopic movement.

37. In a lubricating apparatus, the combination of a receiver having a head and a neck presenting a passage extending through said neck and having an inlet in said head; and a filler comprising two relatively telescopic members, having provision by relative telescopic movement transversely of said neck to clamp said head therebetween, and means normally to retain said members in a relatively extended position considered with respect to their relative, telescopic movement.

38. In a lubricating apparatus, the combination of a receiver having a head and a neck presenting a passage extending through said neck and having an inlet in said head; and a filler comprising two relatively telescopic members, having provision, by relative telescopic movement transversely of said neck, to clamp said head therebetween, and a spring means normally to retain said members in a relatively extended position considered with reference to their relative, telescopic movement, said spring means being adapted to yield and to permit such movement upon the application of the sufficient degree of force on one member relatively to the other.

39. In a lubricating apparatus, the combination of a receiver having a spherical head and a neck presenting a conduit extending through said neck and having an inlet in said head; and a filler comprising two relatively telescopic members, one presenting a socket to receive said head, and the other presenting surfaces adapted to embrace said neck and to cooperate with said head upon movement transversely of said neck and relatively to the first said member to urge the first said member into firm engagement with said head, said members presenting relatively telescopic conduits, communicating with each other and one being adapted to communicate with said conduit in said receiver.

40. A coupler for use in combination with a ball headed lubricant fitting comprising a pair of telescoping and relatively slidable sleeves, one of said sleeves being formed with a ball receiving socket for the reception of the ball head of said lubricant fitting and provided with fitting head and shank receiving openings disposed at a side and at an end thereof.

41. A coupler and lubricant nozzle for a ball-head lubrication fitting having a lubricant receiving duct through the head comprising, an outer sleeve having a head at one end and a ball receiving socket within said head in communication with a slot extending transversely of the axis of the sleeve, said head also having an opening through a side wall into said socket for passage of the ball-head of a fitting into said socket, said slot [illegible] than the diameter of the ball-head of a fitting, an inner sleeve slidably mounted within the outer sleeve and having one end movable into said ball receiving socket, and means for urging said ends of said sleeves relatively toward one another for securing the ball-head of a fitting in said socket.

42. A coupler and lubricant nozzle for a ball-head lubrication fitting having a neck and a lubricant receiving duct through the head and neck comprising a sleeve having one end formed to provide an internal socket

thereat for the reception of the ball-head of a fitting, said sleeve having an opening through a side wall into said socket for passage of the ball-head therethrough into the socket, said sleeve end having a slot extending partially thereacross transversely thereof and communicating with said socket and opening, said slot being of less width than the diameter of said ball-head and at least equal to the thickness of said neck of said fitting.

43. A coupler and lubricant nozzle for a ball-head lubrication fitting having a neck and a lubricant receiving duct through the head and neck comprising a sleeve having one end formed to provide an internal socket thereat for the reception of the ball-head of a fitting, said sleeve having an opening through a side wall into said socket for passage of the ball-head therethrough into the socket, said sleeve end having a slot extending partially thereacross transversely thereof and communicating with said socket and opening, said slot being of less width than the diameter of said ball-head and at least equal to the thickness of said neck of said fitting, and means slidably mounted in said sleeve for releasably securing the ball-head of a fitting in said socket and making a lubricant-tight seal with said ball-head.

44. A coupler and lubricant nozzle for a ball-head lubrication fitting having a neck and a lubricant receiving duct through the head and neck comprising a sleeve having one end formed to provide an internal socket thereat for the reception of the ball-head of a fitting, said sleeve having an opening through a side wall into said socket for passage of the ball-head therethrough into the socket, and means slidably mounted in said sleeve for releasably securing the ball-head of a fitting in said socket and making a lubricant-tight seal with said ball-head.

45. A grease feeder for a plurality of bearings having spherical lubricant-receiving ported members with port openings at various angles with the axes of said members comprising a source of lubricant supply, means for holding the supply member in engagement with a ported member to which it is applied, the joint face between the supply and ported member being of a circular form to permit the location of port openings in the bearings at said different angles.

46. A lubricant feeding device for detachable connection to a lubricant receiver comprising means for applying pressure to a lubricant in the feeding device, and a detachable connection for engaging the feeding device with the lubricant receiver comprising, means for drawing the feeder up tightly against the receiver but permitting slidable movement at the joint face of the feeder with the receiver.

47. A grease feeding system for a mechanism having a plurality of bearings with apertured projections at different points thereof comprising a rigid feeder member having means for making universal connections to said apertures for clearing obstructions, means for detachably connecting the free end of said feeder member with said apertures, and means for supplying lubricant under pressure to the other end of said feeder member.

48. The combination with a mechanism comprising a variety of bearings located at different points thereof, each bearing provided with an anperture for receiving lubricant, of means for supplying lubricant to said apertures comprising a lubricant feeder having means for forming different angular connections to said apertures for clearing obstructions without requiring flexure of said feeder, means for successively attaching the free end of said feeder to said apertures, and means for supplying lubricant under pressure to the other end of said feeder.

49. The combination with a coupler for quick-detachably connecting a lubricant source with a ball-head fitting comprising inner and outer sleeve members, the outer sleeve member adapted at one end to project beyond the corresponding end of the inner sleeve member and having a shoulder adapted to engage a portion of the ball-head of a fitting, the inner sleeve having a concavely spherical seat about its said corresponding end for engaging the ball-head of the fitting, said shoulder and seat being substantially oppositely directed for reception of the ball-head of the fitting therebetween, of means for forcing lubricant through said inner sleeve, and a non-flexible connection between said forcing means and one of said sleeves.

50. The combination with a coupler for quick-detachably connecting a lubricant source with a ball-headed fitting comprising inner and outer sleeve members, the outer sleeve member adapted at one end to project beyond the corresponding end of the inner sleeve member and having a shoulder adapted to engage a portion of the ball-head of a fitting, the inner sleeve having a concavely spherical seat about its said corresponding end for engaging the ball-head of the fitting, said shoulder and seat being substantially oppositely directed for reception of the ball-head of the fitting therebetween, of means for urging said shoulder and seat relatively in opposite directions, means for forcing lubricant through said inner sleeve, and a non-flexible connection between said forcing means and one of said sleeves.

51. The combination with a coupler for quick-detachably connecting a lubricant source with a ball-headed fitting comprising inner and outer sleeve members, the outer sleeve member adapted at one end to project beyond the corresponding end of the inner

sleeve member and having a shoulder adapted to engage a portion of the ball-head of a fitting, the inner sleeve having a concavely spherical seat about its said corresponding end for engaging the ball-head of the fitting, said shoulder and seat being substantially oppositely directed for reception of the ball-head of the fitting therebetween, of means for urging said shoulder and seat relatively apart, means for urging said shoulder and seat relatively toward one another, means for forcing lubricant through said inner sleeve, and a non-flexible connection between said forcing means and one of said sleeves.

52. The combination with a coupler for quick-detachably connecting a lubricant source with a ball-headed fitting comprising inner and outer sleeve members, the outer sleeve member adapted at one end to project beyond the corresponding end of the inner sleeve member and having a shoulder adapted to engage a portion of the ball-head of a fitting, the inner sleeve having a concavely spherical seat about its said corresponding end for engaging the ball-head of the fitting, said shoulder and seat being substantially oppositely directed for reception of the ball-head of the fitting therebetween, of means for relatively drawing said shoulder and seat toward one another, means for forcing lubricant through said inner sleeve, and a non-flexible connection between said forcing means and one of said sleeves.

53. The combination with a coupler for quick-detachably connecting a lubricant source with a ball-headed fitting comprising inner and outer sleeve members, the outer sleeve member adapted at one end to project beyond the corresponding end of the inner sleeve member and having a shoulder adapted to engage a portion of the ball-head of a fitting, the inner sleeve having a concavely spherical seat about its said corresponding end for engaging the ball-head of the fitting, said shoulder and seat being substantially oppositely directed for reception of the ball-head of the fitting therebetween, of means for urging said shoulder and seat relatively in opposite directions, said urging means including a resilient element operative to effect relative movements between said shoulder and seat in one direction of relative movement therebetween, means for forcing said lubricant through said inner sleeve, and a non-flexible connection between said forcing means and one of said sleeves.

54. The combination with a lubricant receiving member having a lubricant receiving opening with a contact face about said opening, means for supplying lubricant to said receiving member comprising a nozzle member having a contact face, one of said contact faces presenting a circular edge and the other of said contact faces presenting a convex spherical portion, said edge and said spherical portion being cooperative to effect a seal therebetween from anyone of a plurality of angularly different positions.

55. In combination, a lubricant receiving fitting having an inlet opening encompassed by a contact face, means for supplying lubricant under pressure to said fitting through said opening, said means including a tubular member having a contact face at one end surrounding the passage therethrough, said contact faces being cooperative to maintain at least a line contact between the faces completely about said inlet opening to maintain a seal, one of said contact faces being of spherical contour whereby said line contact and therefore a seal may be effected from any one of a plurality of different angular relations between said fitting and tubular member.

56. In combination, a lubricant receiving fitting having an inlet opening encompassed by a contact face, means for suplying lubricant under pressure to said fitting through said opening, said means including a tubular member having a contact face at one end, surrounding the passage therethrough, said contact faces being cooperative to maintain contact between the faces completely about said inlet opening to maintain a seal, one of said contact faces being of spherical contour whereby said contact and therefore a seal may be effected from any one of a plurality of different angular relations between said fitting and tubular member.

57. The combination with a lubricant feeder, of a bearing for receiving the lubricant having a feeder connection member, the joining faces between the connection member and the feeder comprising a spherical joint face having a port within the face and a contact ring having a port within the ring, and means for holding these faces in contact through a range of varying angular positions with the port openings within the range of contact.

58. In combination a lubricant receiving member provided with a head having a bearing surface with a port therein, a lubricant supply member having a complementary bearing surface with a port adapted to register with the first port, a clamping member arranged to embrace said head, and manually controlled means for moving the clamping member with respect to the supply member to allow the application of the lubricant supply member to the receiving member and thereafter positively to clamp said members together.

59. In combination a lubricant receiving member provided with a head having a spherical bearing surface with a port therein, a lubricant supply member having a complementary bearing surface adapted to have universal movement with respect thereto and having a port adapted to register with the first port, a clamping member arranged to

embrace said head, and manually controlled means for moving the clamping member with respect to the supply member to allow the application of the lubricant supply member to the receiving member and thereafter positively to clamp said members together while allowing universal motion therebetween.

60. The combination with means forming a lubricant bearing nipple, of a rigid supply means for the lubricant under pressure, non-flexible means connected with the lubricant supply means for engaging the nipple, the bearing nipple having ported attachment means disposed and pointing in any one of a plurality of different directions in addition to that in line with its axis so that the lubricant supply means may be applied thereto to clear an obstruction adjacent to the nipple without flexing the parts.

61. The combination with a lubricant nipple for a bearing of a source of lubricant supply, means adapted to connect the source of lubricant to the nipple, said nipple forming a universal joint with said connecting means and having a port arranged to register with the connecting means when the latter is applied thereto so that the connecting means may be free from flexure when coupled to said nipple in various angular relationships.

62. The combination with a mechanism comprising a variety of bearings located at different points thereof and at different angles, each bearing being provided with an aperture for receiving lubricant, of means for supplying lubricant to said apertures comprising nipples mounted on said bearings in said apertures, said nipples having ports opening at a plurality of different angles to clear obstructions, a quick-detachable universal clamping means for successively connecting a source of lubricant supply with each of said nipples, said clamping means comprising means for securing the connection between source and said nipples against the escape of lubricant, and means for applying pressure to the lubricant supplied to said nipples.

In witness whereof, I have affixed my signature.

WILLIAM L. MORRIS.

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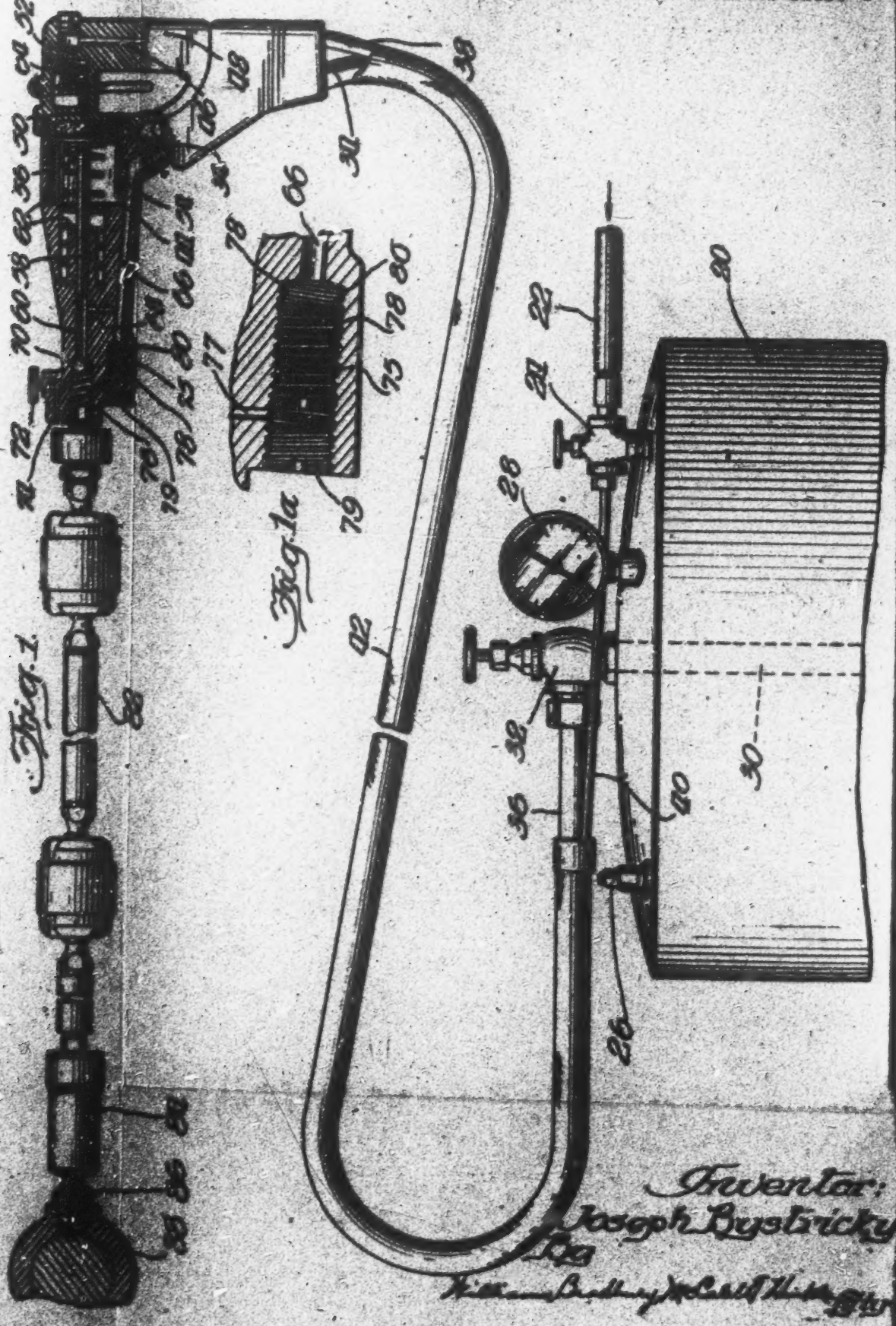
Oct. 8, 1935. J. BYSTRICKY 2,016,909

LUBRICATING APPARATUS

Filed March 20, 1933 5 Sheets-Sheet 1



Oct. 8, 1935. J. SYSTRICKY 2,016,809

LUBRICATING APPARATUS

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Fig. 2.
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LUBRICATING APPARATUS

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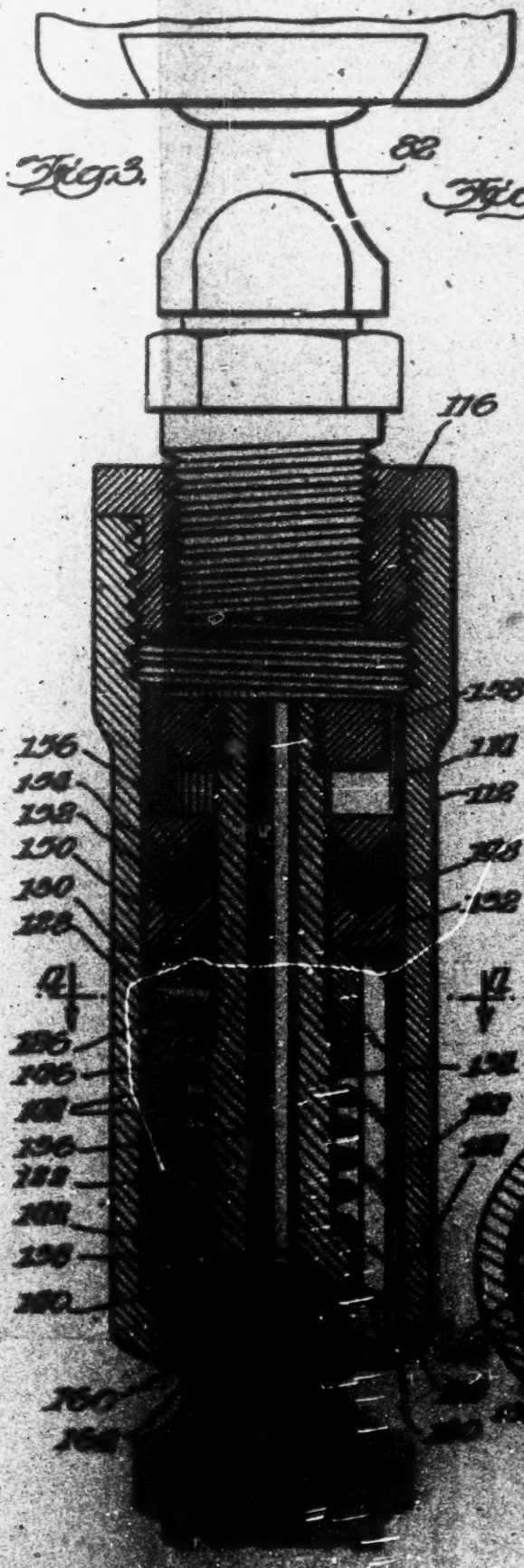

Fig. 3.

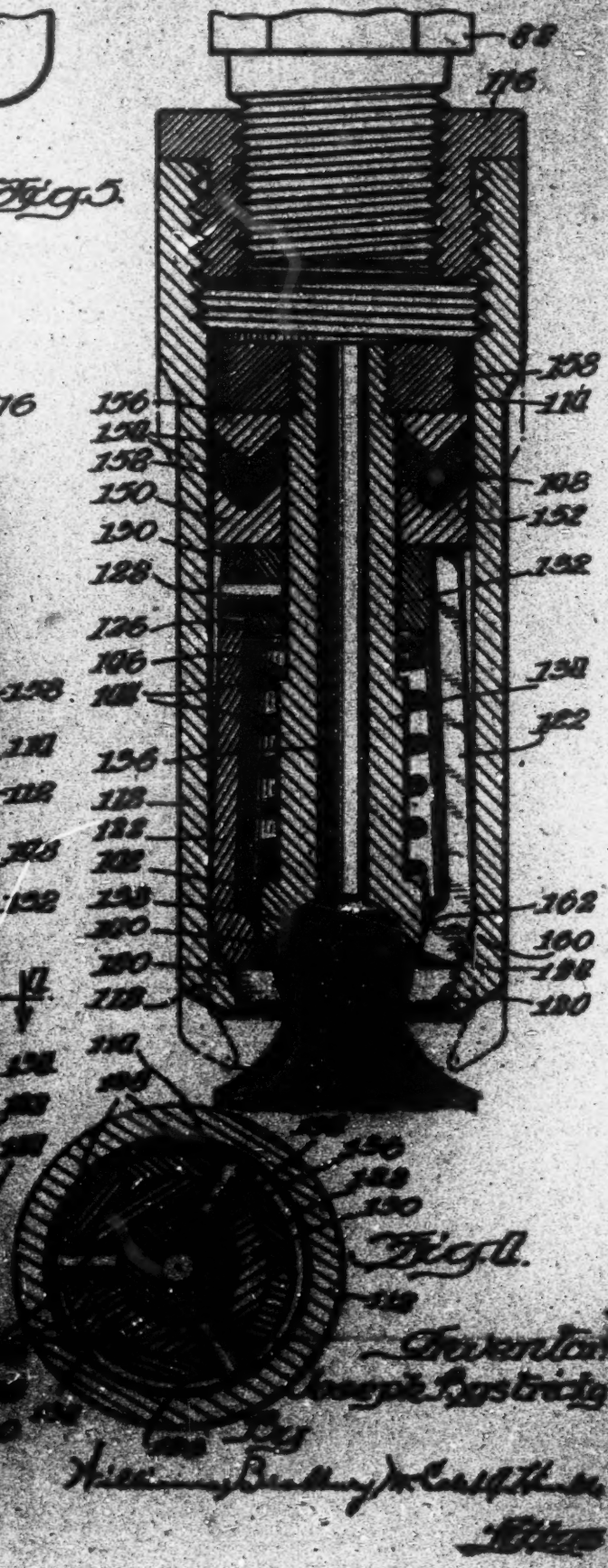

Fig. 5.

Fig. 1.

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Oct. 8, 1935. J. BYSTRICKY 2,016,809

LUBRICATING APPARATUS

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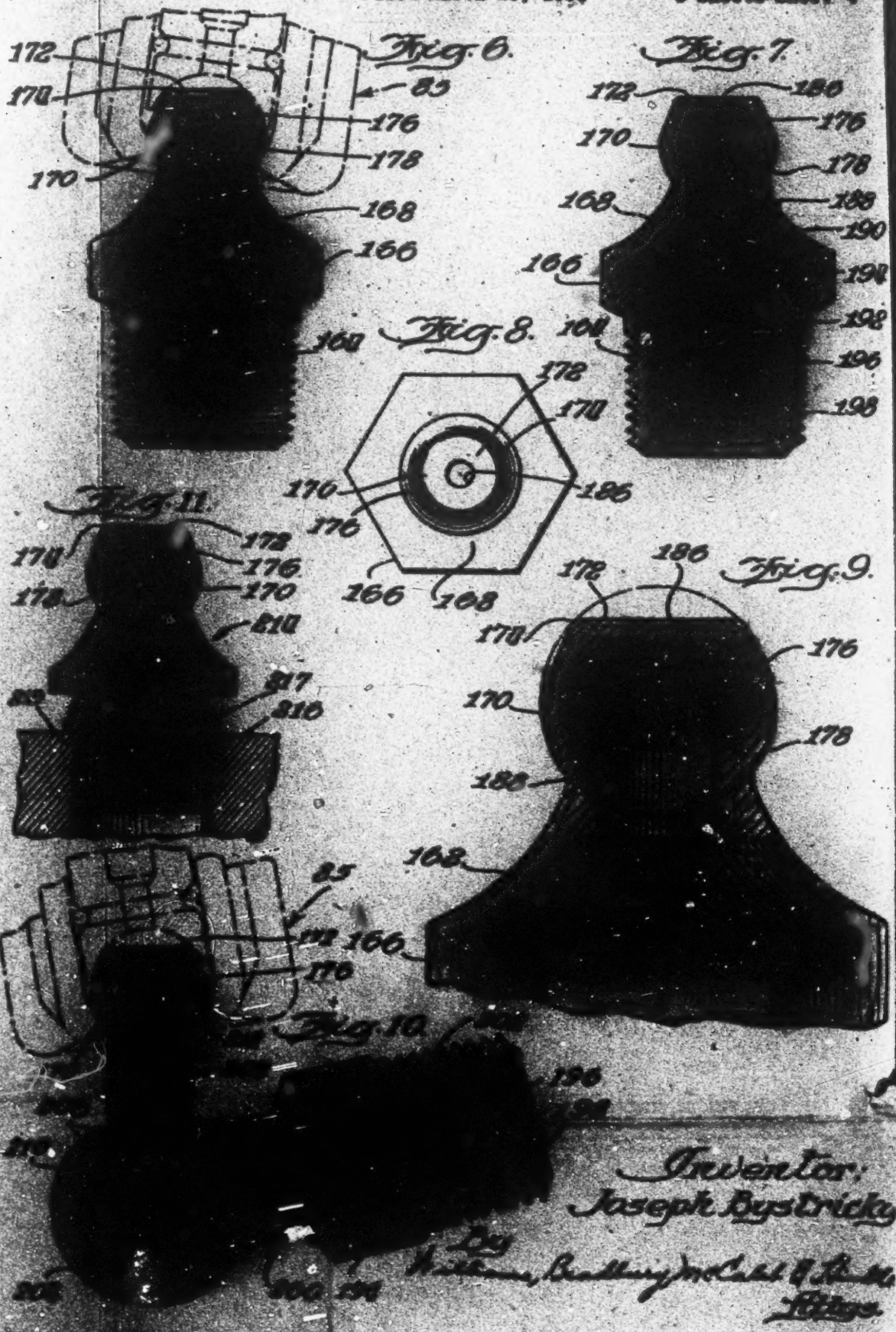

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LUBRICATING APPARATUS

Filed March 20, 1933 5 Sheets-Sheet 5

Fig. 10.

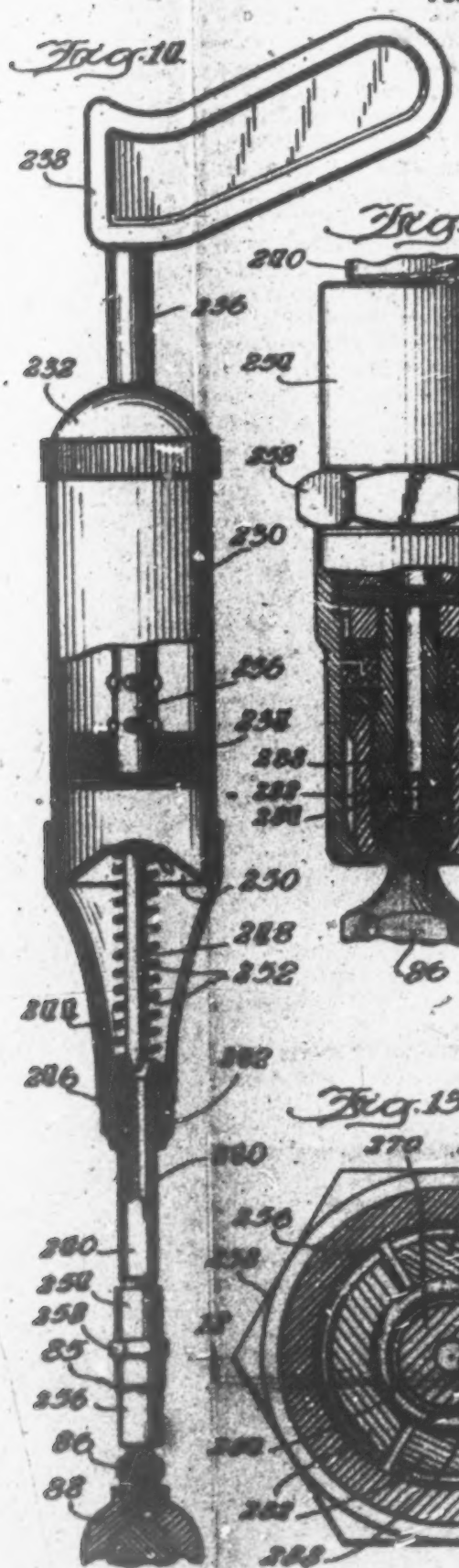


Fig. 11.

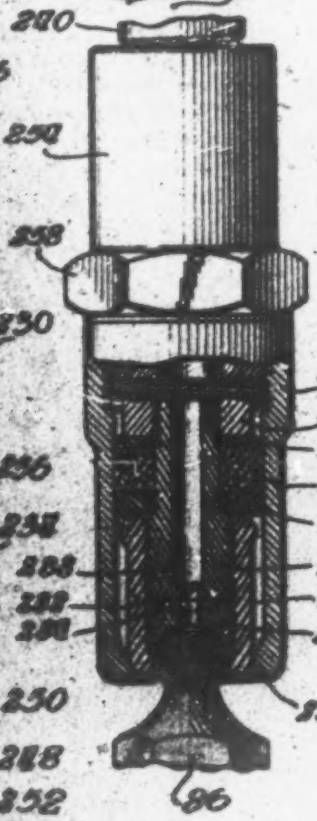


Fig. 12.

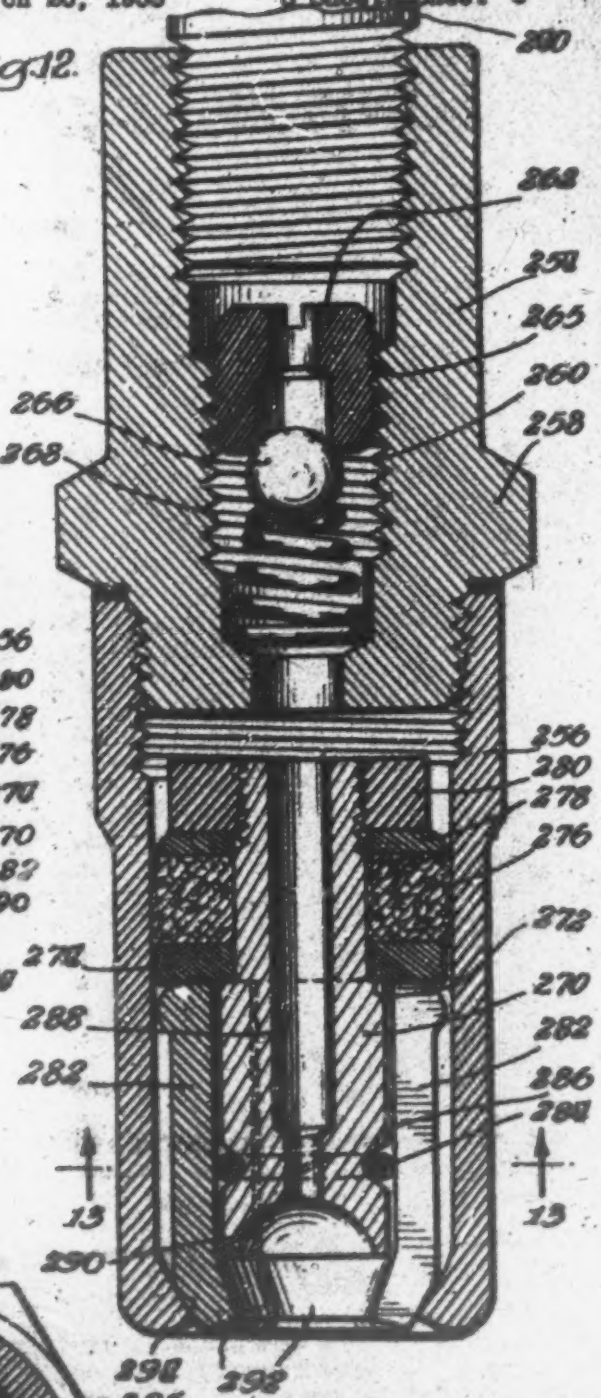
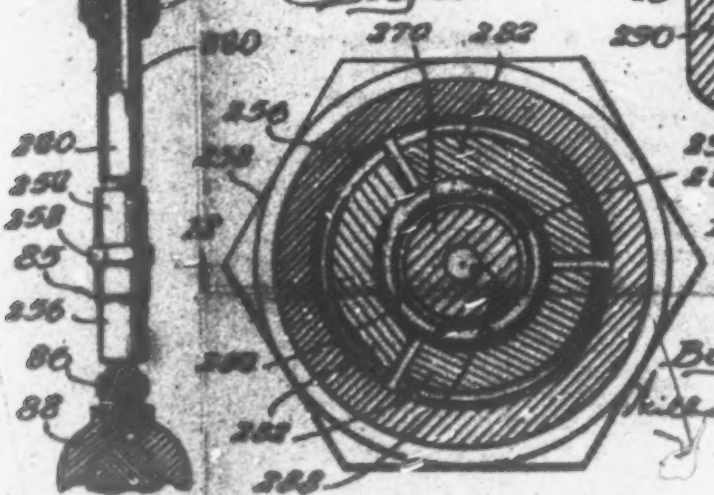


Fig. 13.



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By

Attys

UNITED STATES PATENT OFFICE

2,016,809

LUBRICATING APPARATUS

Joseph Rystelsky, Chicago, Ill., assignor, by mesne assignments, to Stewart-Warner Corporation, Chicago, Ill., a corporation of Virginia

Application March 20, 1933, Serial No. 661,713

16 Claims. (Cl. 221—47.4)

My invention relates generally to lubricating apparatus, and more particularly to an improved high pressure lubricating system.

As is well known, a large number of automobiles and similar machines have their bearings regularly equipped with a lubricant-receiving fitting to which a source of lubricant under high pressure may be detachably coupled so as to force lubricant (usually grease) into the bearing under extremely high pressures, in the order of 10,000 pounds per square inch. A number of different systems of this type are at present in use, but each of these systems has one or more defects which renders it not entirely satisfactory. In one system the defect may be its high cost, in another the defect may be the inability to utilize high pressures, and in others the defect may be difficulty of operation.

Most of these lubricating systems were designed and provided with the expectation that they would be used at a maximum pressure of 2000 or 3000 pounds per square inch. In many machines, particularly automobiles, in which the lubricating operation is generally performed somewhat irregularly, the bearings will frequently become clogged or "frozen" to an extent such that a lubricant pressure of 2000 or 3000 pounds per square inch is insufficient to dislodge the caked lubricant in the bearing, and it is necessary to utilize a pressure as high as 10,000 or 12,000 pounds per square inch to accomplish this result.

In one high pressure lubricating system customarily referred to as the "push-type" system, the lubricant-receiving fitting has a contacting face defined by a circular dirt-cutting edge. In this system (disclosed in the patent to Oscar U. Zerk, No. 1,675,909), the lubricant compressor has a nozzle which is conformed and arranged to make sealing contact with the tip of the fitting merely by being pressed thereagainst. The nozzle has a spherically concave contact surface which is adapted to embrace the contact edge of the fitting and make sealing contact therewith when pressed thereagainst, even though the axis of the nozzle is held at a considerable angle relative to the axis of the fitting. This system has a large number of advantages, particularly in simplicity, low cost, and ease and rapidity of operation. It has been found extremely difficult, however, to utilize high lubricant pressures in this system, since it is necessary for the operator to hold the lubricant compressor nozzle tightly against the fitting in opposition to the high back pressure exerted by the lubricant. When the pressure is from a few hundreds to 2000 or 3000 pounds, this may be done without great difficulty, and, while it may under favorable circumstances also be done with pressures as high as 10,000 pounds per square inch, the operation of lubricating a machine equipped with the push-type system is tiring, since it requires considerable manual effort to hold the nozzle of the compressor against the fitting when the higher pressures are used.

In the system of my invention, I utilize a fitting in some respects similar to that employed in the above described push type system, and utilize a coupler for making a detachable connection with the fitting, which in some respects is also similar to the nozzle of the push type system. In my system, I have retained all of the advantages of the push type system, but have provided additional means to overcome its disadvantages.

In the system of my invention, the nozzle forms a part of an automatic coupler which is adapted to be mechanically locked to the lubricant-receiving fitting so that, having established the coupling connection, the operator need not continuously apply a force to maintain the connection. The operation of lubricating an automobile, or similar machine, is thereby rendered much easier, more certain, and more rapid than by the use of any of the high pressure lubricating systems at present in use.

It is therefore an object of my invention to provide a new and improved high pressure lubricating system employing a coupler and fitting connection which is capable of maintaining a tight seal under extremely high pressures.

A further object is to provide an improved lubricating system of the high pressure type in which the coupler may be positively locked to the lubricant-receiving fitting upon the application of lubricant pressure thereto and may readily be disconnected from the fitting upon release of pressure.

A further object of my invention is to provide an improved high pressure lubricating system in which the release of lubricant pressure causes the automatic disconnection of the coupler from the lubricant-receiving fitting.

A further object is to provide an improved automatic means for relieving the lubricant pressure at the coupler upon completion of a lubricating operation.

A further object of my invention is to provide an improved form of coupling connection for high pressure lubricating apparatus.

A further object of my invention is to provide

an improved coupler for high pressure lubricating apparatus.

A further object of my invention is to provide an improved high pressure lubricating system which may be used to force lubricants under extremely high pressures to the bearings to be lubricated, the parts of which are simple in construction, may be economically manufactured, and which may be easily operated.

Other objects will appear from the following description, reference being had to the accompanying drawings, in which

Figure 1 is an elevation of a complete power-operated lubricating system embodying my invention, portions of the high pressure booster being shown in central vertical section;

Figure 1a is an enlarged sectional view of the pressure relief by-pass means;

Figure 2 is an elevational view of my improved lubricating system, in which the compressor is hand operated, portions of the compressor being shown in central vertical section;

Figure 2a is an enlarged vertical sectional view of the booster nozzle of the lubricant compressor shown in Figure 1, showing a preferred form of coupler attached thereto;

Figure 3 is an enlarged central vertical section of a modified form of my improved coupler shown coupled to a lubricant-receiving fitting;

Figure 4 is a transverse sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a view similar to Figure 3, showing the parts in uncoupled position;

Figure 6 is an enlarged elevation of the fitting, the possible angularity which may be assumed by the coupler being illustrated in dotted lines;

Figure 7 is a central vertical sectional view of the fitting shown in Figure 6;

Figure 8 is a plan view of the fitting shown in Figure 6;

Figure 9 is an enlarged central vertical sectional view of the head portion of the fitting;

Figure 10 is a side view, partly in section, showing an angle fitting;

Figure 11 is an elevation of a modified form of fitting;

Figure 12 is an enlarged central vertical sectional view of the preferred form of the coupler of my invention;

Figure 13 is a transverse sectional view thereof taken on the line [illegible] of Figure 12;

Figure 14 is an elevation of a push-type lubricant compressor connected to a fitting, parts thereof being shown in section to illustrate the operating parts; and

Figure 15 is an enlarged longitudinal sectional view showing the coupler connected to a lubricant-receiving fitting.

In the embodiment of the lubricating system of my invention illustrated in Figure 1, a number of [illegible] and other parts to be lubricated [illegible] lubricant to the bearings of the [illegible] in Fig. 1 is [illegible] of any suitable construction, [illegible] compressed in the system [illegible].

In this system, the lubricant is supplied from a container 20, which, as in the form of a large tank, and is maintained under pressure by compressed air supplied through a hose 22 connected to a valve 24. The latter is connected to the interior of the tank and may be used to control the admission of air under pressure to the tank. A suitable blow-off or safety valve 26 may be provided to prevent excess pressure within the tank, and a pressure gauge 28, to indicate pressure within the tank, may also be provided. Lubricant is forced from the container 20 through a pipe 30 which extends through the container and has an angle globe valve 32 at its upper end. The pipe 30 will, of course, extend to substantially the bottom of the container 20. A hose 34 is connected to a suitable nipple 36 coupled to the globe valve 32 and an air hose 38 is connected to a pipe 40 which is coupled to the valve 24. The hose 34 and 38 are preferably bound together by a fabric covering 42.

The ends of the hose 34 and 38 are connected to a compressor or "booster" 44, which may be of any suitable construction. In the embodiment illustrated, the air hose 38 is connected to an air passageway 46 formed within the handle portion 48 of the booster. Flow from the passageway 46 to a duct 50 is controlled by a manually operated valve 52. The duct 50 leads to an air cylinder 54, in which a piston 56 is reciprocable. The piston carries a plunger stem 58, which is reciprocable in a plunger cylinder 60. A compression coil spring 62 motivates the piston on its return stroke, when the pressure in the air cylinder is released by closing the valve 52 and opening the valve 64, the latter serving to connect the duct 50 to the atmosphere.

The grease hose 34 is connected to a passageway 66 formed in the body 44 of the booster. An inlet duct 68 connects the passageway 66 with the plunger cylinder 60. The end of the plunger cylinder 60 is closed by an outlet check valve 70.

In utilizing a booster of this type with the system of my invention it is desirable, if not necessary, to provide means for relieving the lubricant pressure in the discharge conduit. One such means is illustrated in Fig. 1 as comprising a manually operable needle valve 72 which, when open, will relieve the pressure in the discharge conduit by opening a passageway 74 leading from the outlet check valve chamber 76 to the atmosphere. By opening this valve, the pressure in the discharge conduit may, of course, be reduced substantially to atmospheric pressure. This arrangement for relieving the pressure is not wholly satisfactory, inasmuch as a certain quantity of lubricant is discharged to the atmosphere each time the pressure is released. The discharged lubricant is wasted and smears over parts of the compressor and drops therefrom and generally renders the lubricating operation untidy. I have, therefore, provided an additional pressure relieving means which will normally be effective in relieving the pressure in the discharge conduit [illegible] of the coupler.

This pressure relieving means comprises a [illegible] by-pass from the discharge check valve chamber 76 to the passageway 66. In Fig. 1 and in this by-pass is shown in the [illegible] [illegible] [illegible] a threaded lateral bore 78, that is the axis of the thread is parallel to, but spaced eccentrically, the maximum diameter of the plug is less than root diameter of the threaded bore 78 and slightly greater than the root diameter of the internal threads in said bore. The outer end of the bore 78 is closed by a tightly fitting plug 79. One end of the bore 78 communicates with the passage-

way 86 while the other end communicates with the valve chamber 78 through a drilled passageway 77.

The passageway 78 thus permits a very small quantity of lubricant to flow from the valve chamber 78 to the passageway 86 whenever the pressure in the former is greater than the pressure in the latter. This slight flow of lubricant will cause the pressure in the discharge conduit to drop to a pressure approximately that in the passageway 86 within a very short time after the cessation of operation of the booster. The flow through the passageway 78 will not, however, be sufficiently great appreciably to lessen the quantity of lubricant discharged by the booster during its operation.

Other suitable means may be provided to relieve the pressure in the discharge conduit. It is preferable however that the means used be automatic in operation and further that the lubricant be not vented to the atmosphere.

In Fig. 1, the discharge conduit is illustrated as a flexible ball-jointed hose 82 of the type shown in the W. F. Hundemer Patent No. 1,603,916. The coupler 84 of my invention is secured to the end of the hose 82 and is shown as connected to a lubricant-receiving fitting 86 threaded in the oil hole of a bearing 88 to be lubricated.

The system of my invention may also have a hand operated lubricant compressor incorporated therein, as illustrated in Fig. 2. The compressor there shown is of well known construction, being illustrated in the patent issued to George F. Thomas and Joseph Bystricky, Patent No. 1,968,231, July 31, 1934.

The compressor comprises a barrel 90 for containing lubricant, the lubricant being forced from the barrel by a spring-pressed follower piston 92 into the high pressure cylinder 94 through an inlet port 96.

A plunger 98 is manually reciprocable by means of the lever 100 to eject lubricant from the cylinder 94. A coupler 85 of my invention (shown in detail in Figures 12, 13, and 15 and described hereinafter) is secured to the end of the booster 102 and is illustrated as being connected to a fitting 86 screwed into the oil hole of a bearing 88. This compressor has a by-pass valve 104 held against its seat by a spring 106. The abutment for the spring comprises the end of a threaded stem 108, longitudinally slotted, which may be rotated by means of a wing handle 110.

The stem 108 has a vent valve 111 which, upon unscrewing the stem 108, will be opened to permit venting of the lubricant from the discharge passageway of the grease gun, through the slot in the stem, to the atmosphere. A valve 113, similar to the valve 111, is also secured to the stem 108 and adapted to close when the stem has been unscrewed to its maximum extent.

When the booster 102 is being used, the stem 108 will be unscrewed to bring the valve 113 against its seat and to permit the ball 104 to move away from its seat. Thereupon lubricant may be forced directly from the barrel 90 by the spring pressed piston 92 to the booster 102. Under these circumstances, the pressure in the booster will be relieved automatically upon the retractile stroke of the booster. However, if the pressure is not sufficiently relieved to permit uncoupling, the valve stem 108 may be rotated so as to raise the valve 113 slightly from its seat and permit escape of lubricant through the slot in the stem 108 to the atmosphere. Ordinarily, it will be sufficient to reduce the pressure to that present in the barrel 90, but under certain unusual circumstances it may be desirable to vent the gun to the atmosphere. Usually, when using the booster 102 with the compressor, the valve 113 will be screwed firmly against its seat, and lubricant forced to the bearing by pushing it toward the fitting to operate the booster, without operating the plunger 98.

As shown in Fig. 2a, the booster 102 comprises a union part 87 which is threaded to the discharge nipple 88 and has a male coupling part 101 engageable in the nipple 88. A spring pressed cup washer 103 seals the coupling connection. The part 101 has an inlet check valve seat 105 for the loose check valve 107 and is threaded to a high pressure cylinder 109. A hollow plunger 111' is reciprocable in the bore of cylinder 109 and at its outer end carries the coupler 85. The plunger is pressed outwardly by a spring 113' and is guided by a pair of telescoping sleeves 115, 117 secured to the plunger and cylinder respectively. A seal around the plunger is effected by a hat-shaped leather packing 121 held in place by a washer 123.

As the lubricant compressor is pushed toward the fitting to be lubricated, the pressure developed by the relative movement of the plunger 111' and cylinder 109 forces the check valve 107 against its seat and causes operation of the clamping mechanism of the coupler 85. Upon retraction of the compressor the pressure within the cylinder 109 drops below atmospheric pressure and a new charge of lubricant is drawn into the bore of the cylinder past the check valve 107. The pressure in the coupling is, however, not immediately relieved due to the incorporation therein of a check valve 266 and a high resistance by-pass 265 described in detail hereinafter, and the coupling will therefore remain clamped to the fitting between successive discharge strokes of the compressor.

The coupler of my invention, in the form shown in Figs. 3, 4, and 5, comprises a substantially cylindrical body 112 which has a cylindrical bore 114. The body at the upper end of the bore 114 is threaded to receive the end of the hose 82, which is illustrated as being connected by means of a threaded bushing 116. The lower end of the body has an inwardly extending flange 118, provided with a frusto-conical inwardly tapering surface 120. This surface forms, in effect, a cam for three jaws 122 which are provided with complementary camming surfaces 124.

The jaws 122 are provided at their upper ends with apertures 123, through which pins 128 project, the latter being rigidly secured in a ring 130 and being of slightly lesser diameter than the apertures 126. The ring 130 is freely reciprocable upon the reduced diameter portion 132 of a nozzle element 134.

The nozzle element 134 has a central bore 136, the lower end of which has a bell mouth formed by a concavely spherical surface 138 and a flaring conical surface 140. The nozzle element 134 has a shoulder 142 forming a seat for a compression spring 144, the upper end of which abuts against the ring 130. The degree of compression of the spring 144 is limited by the engagement of the ring 130 with a stop shoulder 146.

An annular piston 148 is composed of a metallic ring 150 having a trough-like groove 152 in its upper surface to receive a pair of annular packing washers 154, which are V-shaped in cross-section. The packing washers 154 are held in place by a metallic ring 156, the lower portion of which is V-shaped in cross-section to fit into

the upper packing washer 166 and maintains the packing washers spread in lubricant sealing contact with the walls of the bore 114 and the external surface of the portion 132 of the nozzle element. A nut 168 is threaded on the upper end of the nozzle element 134 and serves as a stop to limit movement of the latter in both directions. The jaws 122 have thickened gripping portions 169 provided with inwardly facing surfaces 162 substantially in the form of portions of the surface of a cone.

The type of fitting with which the above described coupler is adapted to be used is best illustrated in Figs. 6 to 9, inclusive, and comprises a tubular body having a threaded shank 184, a hexagonal wrench-engaging portion 186, a generally conical portion 188 and a head 178. The head has a flat tip surface 172 bounded by a relatively sharp dirt-cutting edge 174. While, in theory, the edge 174 should be very sharp, in practice it is found desirable slightly to round this edge, as indicated by the construction lines shown in Fig. 9. The radius of curvature of this edge 174 is extremely small, preferably approximately one-twelfth of the diameter of the contact face 172, so that there will be substantially a "line" contact between the fitting and the concavely spherical surface 136 of the nozzle element.

The upper half 176 of the head of the nipple is substantially frusto-conical in shape, to aid in guiding the coupler into engagement with the fitting. The lower half of the head has a substantially spherical surface 178, the radius of curvature of which is substantially the same as that of the spherical surface 136 of the nozzle, and the dirt cutting edge 174 lies substantially in the surface of the sphere defined by the spherical surface 178. The portion 188 has a surface of revolution formed by a curved line rotated about the axis of the fitting.

The fitting is provided with an inlet opening 190, of extremely small diameter, which communicates with a larger bore 192. A frusto-conical valve seat surface 194 forms a shoulder between a still larger bore 196 and the bore 192 and serves as a seat for a ball check valve 198, which is pressed thereagainst by a conical compression coil spring 200. The spring is held within the bore 192 by a plurality of lugs 202, which are preferably struck inwardly from the end of the fitting. It will be apparent that in a number of details the fitting is similar to that disclosed in the patent to Oscar U. Zerk, No. 1,616,[illegible] dated March 1, 1927.

In Fig. 10 I have illustrated a fitting suitable for use where the bearing is located in a position such that it would be [illegible] impossible to connect the coupler thereto if an ordinary straight fitting, such as shown in Figs. 6 to 9, were employed. The fitting comprises a body 208 having a threaded portion 210 and a substantially spherical head 212. The body 208 is bored and provided with a ball check valve in a manner similar to the body portion of the fitting illustrated in Fig. 7. The head 212 has a hole 214 drilled therein at an acute angle relative to the axis of the fitting. The fitting tip 216 has a shank 218 which is adapted for a press fit in the hole 214, and has a head 220 shaped similarly to the head of the fitting illustrated in Figs. 6 to 9.

If desired, the fittings of the type shown in Figs. 6 to 9, inclusive, may be formed with a drive shank, as illustrated in Fig. 11, wherein the fitting 214 has a head and a generally conical portion similar to the previously described fitting, and a hardened shank portion formed with groove 216 and ledge 217. When the fitting is forcibly driven into the oil hole of a bearing 82, a portion 219 of the bearing will be swaged into the groove 216 by the ledge 217 and thus tightly lock the fitting in place. This type of drive shank and the method employed in driving it in place are more fully disclosed in the copending application of Adiel Y. Dodge, Serial No. 501,536, filed February 6, 1932.

The embodiment of my invention shown in Figs. 12, 13, 14 and 15 is the simplified and preferred form. The coupler shown is attached to a substantially conventional push-type lubricant compressor comprising a barrel 230 having a cap 232 threaded thereto. A piston 234 is secured to a piston stem 236 and is reciprocable within the barrel 230, a handle 238 being secured to the extremity of the piston stem 236. A high pressure discharge tube 240 is guided for reciprocation in a bushing 242 threaded in a lower cap 244 secured to the barrel 230. A suitable packing 246 forms a seal around the discharge tube 240. A plunger 248 is secured to an apertured plate 250 which is clamped between the barrel 10 and the cap 244. A compression coil spring 252 is compressed between the discharge tube 240 and the apertured plate 250 and normally holds the tube in the position shown in Fig. 14.

Assuming that the barrel 230 is partially filled with lubricant, this lubricant will be placed under low pressure upon applying the coupling to a fitting and manually pushing the handle 238 toward the fitting. Until sufficient force is applied to overcome the initial compression of the spring 252 the lubricant in the lower end of the barrel 216 will be forced under low pressure into the cylindrical bore of the discharge tube 240. Thereafter the handle is pressed with greater force in the direction of the fitting, causing the discharge tube 240 to move inwardly. During this inward movement, the plunger 248 displaces the lubricant within the cylindrical bore of the discharge tube 240 and ejects it to the bearing to be lubricated. Upon discontinuing the application of manual force to the handle 238, the spring 252 will force the barrel and its connected parts away from the fitting until the inlet end of the cylindrical bore in the discharge tube 240 is uncovered and lubricant permitted to flow into the cylindrical bore, priming it for the next operation. Of course a check valve is provided in the discharge end of the tube 240 to prevent return flow of lubricant.

The preferred form of coupler, best shown in Figs. 12, 13, and 15, comprises a connecting section 264, one end of which is threaded to receive the end of the discharge tube 240, and the other end of which is externally threaded to receive the sleeve-like coupler body 268. The connecting section 264 has a hexagonal portion 266 by which it may be engaged by a wrench in attaching it to the discharge tube 240, and has a threaded bore 269 into which is screwed an apertured plug 284. The thread on the plug 282 has its apex ground off so that when it is screwed into the bore 269, a helical passageway 285 which is substantially triangular in cross section will be formed between the plug and the connecting section. A ball check valve 286 is normally pressed against the lower end of the opening in the plug 282 by a compression spring 288.

A nozzle 270 has a shoulder 272 formed thereon, the shoulder forming a seat for a backing plate 274 of a piston packing 276, the latter being made of leather or any other suitable material. The piston packing 276 is compressed by a facing

[illegible] against the outer surface of the packing 97, and the threaded cap 98 upon the end of the nozzle 91.

A plunger 99 [illegible] between the nozzle 91 and the body 92 of the compressor, being normally pressed away from the end of the nozzle by a compression spring 100 which is in a chamber 101 formed in the rear portion of the nozzle 91. The nozzle has a stem 102, the lower end of which is of reduced diameter and opens into a ball socket having a substantially spherical contact surface 103. The clamping jaws 104 at their lower ends have conical gripping surfaces 105 which are engageable with the complemental conical surface 106 formed at the lower end of the coupler body 107.

In the usual push type lubricant compressor, it is necessary that the cross-sectional area of the high pressure plunger be made of greater diameter than the diameter of the tip of the fitting with which the compressor is used. The reason for this is that the force applied to the plunger must be greater than the total back pressure exerted at the nozzle, otherwise the nozzle would be pushed away from the fitting by the lubricant pressure, and leakage would occur.

With the system of my present invention, there is substantially no limitation upon the degree of pressure which may be used, and the size of the high pressure plunger in combinations such as shown in Fig. 14 may be made of as small diameter as is compatible with the volumetric requirements of the compressor and good engineering design, since obviously the force holding the nozzle against the fitting is always greater than, and substantially proportional to, the lubricant pressure developed.

When using the compressor, coupler, and fitting combination, particularly as illustrated in Fig. 14, greater pressures may be developed than with the ordinary push type lubricant compressor nozzle and fitting combination because of the greater ease with which the compressor may be operated. The operator does not have to guard against accidental displacement of the nozzle from the fitting, and thus may concentrate his effort upon the lubricant discharge stroke of the compressor. In using the compressor in the lubrication of automobiles in which a large number of the fittings are usually located beneath the car, the lubrication operation is greatly simplified since the compressor, having been coupled to a fitting will hang therefrom and be supported thereby, and the tendency of the nozzle to slip from the fitting, which is a disadvantage of the usual push-type system, is entirely eliminated.

In the push type compressor, the effectiveness of the sealing contact between the nozzle and the fitting is greatly reduced during the retractile stroke of the compressor because, during this retractile stroke, the nozzle is held in contact with the fitting only by the force of the spring in the compressor. In the system of my present invention, the force tending to maintain contacts between the nozzle and the fitting, being at all times proportional to the lubricant pressure, is sufficient to maintain a tight seal during the retractile as well as the discharge stroke of the compressor. As a result, leakage of lubricant from between the nozzle and fitting, which frequently occurred with the use of the push type system, is eliminated.

In the lubrication of various machinery the fittings are often of necessity placed in relatively inaccessible positions, and the fact that exact

[illegible] the fitting and coupler to be [illegible] the coupler [illegible] the nozzle [illegible] away from the fitting, thereby [illegible] the jaws [illegible] and locking the coupler to the fitting. At the same time the [illegible] portion 110 firmly against the tip of the fitting so that a [illegible] and is effected between the circular [illegible] of the fitting and the conical [illegible] of the nozzle. The compressor and coupler may be shifted slightly relative to the axis of the fitting without affecting the seal between the nozzle and the fitting. This is because the radius of curvature of the [illegible] surface 103 of the nozzle is substantially the same as the spherical surface 104 of the fitting and because the nozzle is maintained firmly pressed against the fitting by the [illegible] pressure.

Upon the discharge stroke of the compressor the lubricant flows readily past the check valve 108, and upon the return stroke a small quantity of lubricant will leak back to the bore of the high pressure cylinder 109 through the helical by-pass 115 formed between the plug 112 and the threaded bore 113 of the connector 114. If the discharge strokes of the compressor follow in close succession the return flow through the by-pass 115 will not cause sufficient reduction of the lubricant pressure within the external coupling sleeve 116 to cause uncoupling, and the compressor may be pulled with a considerable force in a direction away from the fitting without separating the coupling from the fitting. If, however, it is desired to detach the coupler from the fitting, it is necessary merely to swing the compressor through a slight angle relative to the axis of the fitting, whereupon the jaws will be forced out of clamping engagement with the fitting and permit the coupler to be detached from the fitting with ease.

With the lubricant compressor and coupler shown in Fig. 14 it is possible to develop very much higher pressures than can be obtained in a lubricant compressor equipped with a push-type nozzle even though the latter has a plunger of the same diameter. This is due to the fact that when the compressor is positively clamped to the fitting the operator can direct his muscular energy much more effectively to push the compressor toward the fitting than if his attention and effort must be expended in taking care that the nozzle remains in contact with the fitting, as well as to apply the force necessary to push the plunger into the discharge cylinder. In addition to the fact that higher pressures can be developed because of the greater ease with which the workman's energy may be applied effectively to the compressor, the system of my invention has the additional inherent advantage that the size of the high pressure plunger of the compressor is not limited by the size of the contact face of the fitting, as is the case with the well known push-type system, but the plunger

may be made of any desired diameter. There is thus no theoretical limit upon the degree of pressure which the gun may be designed to develop. Of course, in practice the plunger is made of such size that a reasonable quantity of lubricant may be delivered to the bearing upon each discharge stroke of the compressor at a sufficiently high pressure to force the lubricant into any bearing which may normally be encountered. With the compressor of my invention, which is thus capable of developing such high pressures, the frequently encountered necessity of disassembling the bearing in order to clean it to remove the caked and gritty deposit is unnecessary since the high pressure developed will be effective to force this material from the bearing without disassembling the bearing parts.

In the operation of the lubricating system of my invention employing the coupler shown in Figs. 3, 4, and 5, the coupler is first applied to the fitting, with the parts in the position shown in Fig. 5. Downward pressure is then exerted upon the coupler body 112 to move the latter to the position in which it is shown in dotted lines in Fig. 5. Then upon application of lubricant pressure, the pistons 148 will be forced downwardly, moving the clamping jaws downwardly until the ring 152 abuts against the shoulder 146. The jaws will then be in the position in which they are shown in Fig. 3. Immediately thereafter, the lubricant pressure will force the coupling body 112 downwardly and its inclined camming surface 156 will engage the complementary surfaces 134 of the clamping jaws and force the latter inwardly into gripping engagement with the substantially spherical surface 130 of the fitting. While in this position, the nozzle element 124 will be firmly pressed against the tip of the fitting, the concavely spherical surface 126 and the dirt-cutting edge 174 forming a lubricant-tight connection, so that lubricant may thereafter flow through the bore 128 of the nozzle element 124 into the lubricant-receiving fitting and therefrom to the part to be lubricated.

After a sufficient quantity of lubricant has been supplied to the part to be lubricated, the pressure in the discharge conduit, and hence in the coupler, is relieved either through the needle valve 72 or through the by-pass 74 in the power operated grease gun of Fig. 1, or by opening the valve 111 in the manually operated grease gun illustrated in Fig. 2 by turning the lever 108 by means of the wing handle 110. When the pressure has been released, the coupler may be removed by swinging it through a small angle relative to the fitting to move the coupler jaws inwardly, the spring 144 will move the coupling sleeve 122 and piston 148 upwardly, and the parts will be in the position in which they are shown in Fig. 5. The jaws have been moved inwardly sufficiently by the spring 144, the coupler body 112 may be removed from the fitting to which it has been coupled and applied to the next fitting on the part to be lubricated.

[illegible] connection may be made [illegible] through the axis of the coupler body [illegible] to the axis of the fitting. [illegible] a fitting located in a comparatively inaccessible position. Furthermore, the coupler and fitting when connected together form substantially a ball and socket connection. Thus the lubricant compressor may be moved through a considerable angle during its operation and yet maintain the sealed connection with the fitting. If the connection were not thus flexible, the operator might break the fittings by inadvertently swinging the lubricant compressor out of its alignment with the fitting. This could happen because of the great leverage through which a force directed sidewardly near the end of the compressor, or upon its handle, would be communicated to the fitting, as for example when using a compressor of the type shown in Fig. 2.

When the bearing being supplied with lubricant does not offer appreciable resistance to the flow of lubricant, the nozzle 124 will be pushed upwardly until it contacts with the bushing 116. The lubricant will then flow to the bearing if the nozzle is held against the fitting with sufficient force to overcome the lubricant back-pressure tending to push the body part 112 of the coupler away from the fitting, without causing the jaws to grip the fitting. Under these circumstances, the nozzle will cooperate with the fitting in the same manner as is employed in the prior art push-type compressors such as disclosed in the aforesaid Zark Patent No. 1,475,880.

In some instances, when the bearing does not offer appreciable resistance to the inflow of lubricant, the jaws will not be clamped about the fitting for the lubricant back-pressure in the coupler will not be sufficient to actuate the clamping jaws. This might occur when lubricant is being forced into a fitting which is not provided with a check valve. The check valve in the fitting will usually offer sufficient resistance to the flow of lubricant to cause the operation of the coupler clamping jaws.

It has been found that with the lubricating system of my present invention, the lubrication of machinery may be expedited, the operation made less tiring, and the lubrication of the machine accomplished with greater thoroughness and with practically no wastage of lubricant. The fittings and couplers may be economically manufactured and are very rugged and durable.

While I have shown and described a particular embodiment of my invention, it will be apparent to those skilled in the art that various modifications in design and construction may be made without departing from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In combination, a high pressure lubricant compressor, a discharge conduit therefor, automatically operable means for relieving lubricant pressure in said discharge conduit, and coupling means secured to the end of said discharge conduit, said coupling means comprising a nozzle element arranged for making a sealed connection with a lubricant receiving fitting when applied thereto at any one of a plurality of angular positions relative to the axis of the fitting, lubricant pressure operated clamping means for holding said coupling means to the fitting, [illegible] and the [illegible] said lubricant pressure operated clamping means for releasing said coupling means from the fitting upon completion of a lubricating operation.

2. High pressure lubricating apparatus, comprising a lubricant compressor having a discharge conduit, means for discharging lubricant into said

[redacted]

7. In a high pressure lubricating system of the type in which a high pressure lubricant compressor is successively connected to lubricant receiving nipples attached to parts to be lubricated, a coupler having means for connecting it to a compressor and comprising a hollow generally cylindrical body having an inwardly tapering extremity, a piston reciprocable in said body, a nozzle element carried by said piston, said element having a metallic nipple engaging part capable of making a sealed connection with the nipple with the axis of said element in any one of a plurality of diverse angular positions relative to the axis of the nipple, and a clamping mechanism operated by lubricant pressure for securely holding the nipple engaging part of said element in sealing engagement with the nipple.

8. In a high pressure lubricating system, the combination of a fitting for receiving lubricant, a high pressure lubricant compressor, a coupler for making a sealed connection between said compressor and said fitting, said coupler having lubricant pressed means for mechanically clamping the coupler to the fitting and having a lubricant conducting passageway, a check valve positioned in said passageway permitting flow of lubricant from said compressor to said fitting and preventing flow in the reverse direction, and a continuously open high resistance by-pass around said check valve.

9. High pressure lubricating apparatus comprising, a fitting for receiving lubricant and having means for securing it to a part to be lubricated, a source of lubricant under pressure, and lubricant pressure-operated coupling means for connecting said source to said fitting, said last named means including a passageway having a check valve therein opening in a direction to permit flow from said source to the fitting and having a continuously open by-pass around said check valve, said by-pass being of relatively great length and small cross-sectional area.

6. A coupler for a high pressure lubricating apparatus comprising a body having a cylindrical bore therein and having an inwardly tapered surface at the extremity thereof, a tubular nozzle element having lubricant-fitting contacting parts, a slidable annular packing between said nozzle and said body, a plurality of clamping jaws arranged to be forced inwardly about the head of a lubricant-receiving fitting upon application of lubricant pressure to said packing, and a spring between said nozzle element and said jaws to retract the latter from clamping position.

7. A coupler for making a quick detachable lubricant-pressure locked connection with a lubricant-receiving fitting forming part of a high pressure lubricant system, comprising a fitting-engag-

[redacted]

9. In a high pressure lubricating system, the combination of a [redacted] fitting, and a coupler for making a detachable lubricant-tight connection with said fitting, said coupler comprising a body having a bore therein, clamping devices, a piston, and an element for making a sealed contact with the fitting, said clamping devices, said piston, and said element being slidable relative to each other and operable upon application of lubricant pressure to said body to make a detachable lubricant-tight connection with the fitting.

10. A coupler for high pressure lubricating apparatus comprising, a cylinder constructed and arranged to be connected to a source of lubricant capable of being placed intermittently under high pressure, a piston reciprocable in said cylinder, means actuated by said piston upon flow of lubricant under high pressure to said cylinder mechanically to clamp said coupler to a lubricant-receiving fitting, a check valve intermediate said source and said cylinder permitting substantially free flow from said source to said cylinder, and means offering high resistance to lubricant flow and forming a constantly open by-pass around said check valve and permitting restricted flow in either direction at all times.

11. In a high pressure lubricating system, the combination of a fitting for receiving lubricant, a coupler for making a detachable connection between a lubricant compressor and said fitting, said coupler comprising a sleeve, a nozzle reciprocably mounted in said sleeve, a piston secured to said nozzle, a plurality of jaws interposed between said nozzle and said sleeve, said sleeve and said jaws having interengaging camming surfaces whereby as said jaws are forced outwardly they will be cammed inwardly by said sleeve, and an expansible split ring spring engaging the inner surfaces of said jaws to hold said jaws against the inner walls of said sleeve.

12. In a high pressure lubricating system, the combination of a lubricant-receiving fitting having a head and neck portion, said head portion terminating in a tip having an end face bounded by a circular edge, a lubricant pressed nozzle having a concave metallic surface for sealing engagement with said circular edge in any one of a plurality of angular positions, clamping jaws associated with said nozzle for engaging beneath the head of said fitting thereby to hold said nozzle against the fitting and an annular piston surrounding said nozzle and movable relative thereto upon application of lubricant pressure to force said jaws into nipple-engaging position.

13. In a high pressure lubricating apparatus,

in combination with a headed fitting for receiving lubricant and a high pressure lubricant compressor, said fitting having a contact face surrounded by a dirt cutting edge, a coupler for making a quick detachable connection with said fitting comprising, a sleeve having an inwardly tapering surface at its outer end, jaws within said sleeve having surfaces cooperable with said inwardly tapering surface of said sleeve, a nozzle plunger having a spherically concave contact surface for making a sealing connection with the fitting, the cross sectional area of said plunger being greater than the area of the contact face of said fitting, an annular piston surrounding said nozzle and reciprocable in said sleeve, said piston being of greater area than the area of the contact face of said fitting, said piston being engageable with said jaws upon application of lubricant pressure to force said jaws outwardly against said inwardly tapering surface of said sleeve thereby to cam the jaws into clamping engagement about the head of the fitting.

14. In a high pressure lubricating system, a clamping discharge nozzle comprising a body having a cylindrical bore therein and an inwardly tapering end portion, an annular piston reciprocable in said bore, a tubular nozzle element slidable in said piston, means to limit relative movement of said piston and said element, and a plurality of clamping jaws mounted for sliding movement between said nozzle element and said body and arranged to be forced into clamping engagement with a lubricant receiving fitting by the tapering end portion of said body.

15. In combination, a source of lubricant under pressure, pumping mechanism supplied with lubricant from said source and operable at will to eject lubricant under high pressure, a lubricant receiving fitting having an enlarged head, a coupler connected to said mechanism, said coupler including lubricant pressure operated means engageable about the head of said fitting tightly to clamp the coupler thereto, and automatically operable means associated with said coupler for rapidly relieving the lubricant pressure therein upon cessation of operation of said pumping mechanism, said means including a highly restricted passageway open at all times for the escape of lubricant from said coupler toward said source.

16. In combination, a source of lubricant under pressure, pumping mechanism supplied with lubricant from said source and operable to eject lubricant under high pressure, a lubricant receiving fitting having an enlarged head, a coupler connected to said mechanism, said coupler including lubricant pressure operated means engageable about the head of said fitting tightly to clamp the coupler thereto, and a highly restricted passageway between said coupler and said source open at all times for relieving the

[illegible]

[illegible]

the inlet end of said coupler, and a constantly open highly restricted passageway by-passing said check valve.

18. In combination, a source of lubricant under pressure, pumping mechanism supplied with lubricant from said source and operable to eject lubricant under high pressure, a lubricant receiving fitting having an enlarged head, a coupler connected to said mechanism, said coupler including lubricant pressure operated means engageable about the head of said fitting tightly to clamp the coupler thereto, an apertured plug secured at the inlet end of said coupler, and a check valve normally closing said aperture, the engaging surfaces of said plug and coupler defining a highly restricted passageway by-passing said check valve.

19. In high pressure lubricating apparatus, the combination of a source of lubricant under pressure, a lubricant receiving fitting, a lubricant pressure actuated coupler for detachably connecting said source with said fitting, a check valve associated with said coupler and in the path of flow of lubricant from said source to said fitting, and a constantly open restricted passageway by-passing said check valve for relieving the pressure in said coupler.

20. In combination, a lubricant receiving fitting having a tip bounded by a circular dirt-cutting edge, a coupler having lubricant pressure operated means for mechanically securing it to said fitting, and a lubricant pressed sealing part mounted in said coupler and having a spherically concave metallic contact surface arranged to be pressed against the circular edge of said fitting and seal thereagainst when said coupler is mechanically secured to said fitting with its axis in any one of a plurality of angular positions relative to the axis of the fitting, the cross sectional area of said sealing part subjected to lubricant pressure being substantially greater than the area of said fitting which is bounded by the circular dirt cutting edge.

21. In combination, a lubricant receiving fitting having a tip bounded by a circular dirt-cutting edge, a coupler having means for mechanically securing it to said fitting, and a lubricant pressed sealing part mounted for reciprocation in said coupler and having a metallic contact surface shaped for sealing engagement with the circular edge of said fitting, the area of said sealing part subjected to lubricant pressure being substantially greater than the area of the tip of the fitting bounded by said dirt cutting edge.

22. In combination, a lubricant compressor having a low pressure chamber, a high pressure cylinder, a high pressure plunger reciprocable in said cylinder and withdrawable therefrom to effect communication between said cylinder and said chamber, and means for relatively reciprocating said cylinder and plunger; a lubricant receiving fitting having a head portion, a coupler connected to said cylinder to receive lubricant therefrom, said coupler including lubricant pressure operated means to clamp it to the head portion [illegible] and forming a high restricted by-pass for lubricant in one direction while permitting relatively free flow in the opposite direction.

23. In a high pressure lubricating system, the combination of a lubricant compressor, [illegible] a lubricant receiving fitting [illegible] and a coupler connected to said compressor and constructed and arranged to be detachably connected successively to said

nipples, said coupler comprising a hollow generally cylindrical body having an inwardly tapering extremity, a piston reciprocable in said body, a nozzle element carried by said piston, said element having a nipple engaging part capable of making a sealed connection with the end of the nipple with the axis of said element in any one of a plurality of diverse angular positions relative to the axis of the nipple, and a clamping mechanism operated by lubricant pressure within said cylindrical body for securely holding the nipple engaging part of said element in sealing engagement with said nipple.

24. In a high pressure lubricating system, the combination of a lubricant compressor, a lubricant receiving fitting having head and neck portions, and a coupler for making a detachable lubricant tight connection between said compressor and said fitting, said coupler comprising a hollow generally cylindrical body having an inwardly projecting camming surface, a plurality of jaws engageable with said camming surface, confined within said body and conformed to engage about the neck of said fitting and permit limited universal movement of the coupler relative to the fitting without breaking the coupling connection, each of said jaws being capable of movement independently of the other jaws whereby when the coupler is swung through an angle greater than a predetermined angle the coupler may be easily removed from the fitting, and a nozzle part having a lubricant conducting passageway extending therethrough, said nozzle part having its outer end conformed to make a universal lubricant-tight connection with the end of said fitting and having its inner end exposed to lubricant pressure in said body, whereby the effectiveness of its sealing contact with the fitting will increase with increased lubricant pressure.

25. In a high pressure lubricating system, the combination of a lubricant compressor, a lubricant receiving fitting constructed for attachment to a part to be lubricated, a coupler having means for connecting it to said compressor, said coupler comprising a hollow substantially cylindrical body having a bore tapering inwardly at its fitting engaging end, a nozzle element reciprocable in said body, said nozzle element having a passageway extending therethrough and having seal forming means for making lubricant-tight connection with the end of said fitting when the coupler and fitting are coupled together with their axes in any one of a plurality of angular relationships, the inner end of said nozzle element having an effective area exposed to the pressure of lubricant in said body which is substantially greater than the area of the seal forming means which is exposed to lubricant pressure, whereby the lubricant pressure will hold the nozzle element in sealing contact with the fitting, and a plurality of jaws confined within said body surrounding said nozzle element and engageable with said fitting beneath the head thereof in any one of said plurality of angular relationships.

26. In a high pressure lubricating system, the combination of a tubular lubricant receiving fitting having one end adapted for attachment to a bearing part, an inlet end of smaller diameter than said first-mentioned end, and a neck of smaller diameter than said inlet end, a coupler comprising a hollow substantially cylindrical body having a bore tapering inwardly at its fitting engaging end, a nozzle element reciprocable in said body, said nozzle element having a passageway extending therethrough and having a fitting-engaging part, said fitting and nozzle having metallic surfaces conformed to provide an engagement therebetween of a circular edge with a substantially hemispherical surface, a piston for pressing said nozzle against said fitting, lubricant pressure operated clamping jaws between said nozzle and said body and cammed inward to engage the neck of the fitting by the tapered portion of said bore, and a lubricant compressor connected to said nozzle for supplying lubricant thereto in sufficient quantity and at sufficient pressure to cause said piston to effect a seal between said nozzle and fitting and to actuate said jaws to grip said neck.

JOSEPH BYSTRICKY.

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R. P. JACQUES.

CONNECTOR FOR LUBRICATING APPARATUS.

APPLICATION FILED AUG. 23, 1920.

1,383,306. Patented July 5, 1921.

Fig. 1.

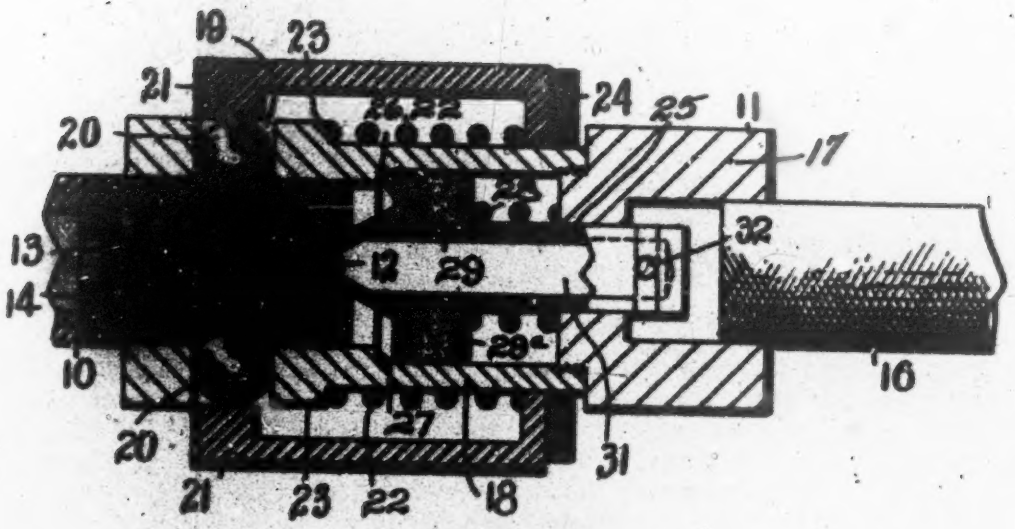
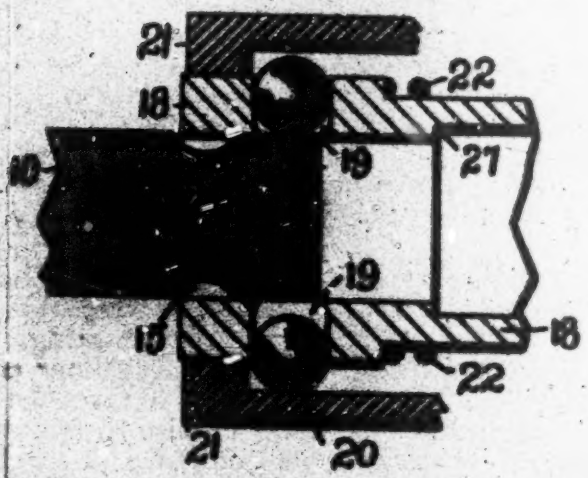


Fig. 2.



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Inventor
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by attorneys.
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UNITED STATES PATENT OFFICE.

RAYNALDO P. JACQUES, OF WOONSOCKET, RHODE ISLAND.

CONNECTOR FOR LUBRICATING APPARATUS.

1,383,306. Specification of Letters Patent. Patented July 5, 1921.

Application filed August 22, 1920. Serial No. 405,349.

To all whom it may concern:

Be it known that I, RAYNALDO P. JACQUES, a citizen of the United States, residing at Woonsocket, in the county of Providence and State of Rhode Island, have invented a new and useful Connector for Lubricating Apparatus, of which the following is a specification.

This invention relates to a connector capable of general application but particularly designed for connecting a grease gun to a grease cup.

It is a great advantage to be able to fill a grease cup without the necessity of removing the cap thereof. Such removal is laborious, unpleasant, and wasteful of both time and grease. It is therefore desirable to provide a valve or other device in each cap for normally closing the grease cup, together with some simple means for connecting the gun to the cup, so that the grease may be forced into the cup through the valve without removing the cap. A firm connection is required, as heavy grease is commonly used, which can only be forced through a restricted passage by the use of considerable pressure.

It is the object of my invention to provide a connector for this and other purposes which will be simple and economical to manufacture, convenient in operation, and strong and reliable in use.

With this general object in view, my invention further relates to certain arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of my invention is shown in the drawings, in which—

Figure 1 is a sectional longitudinal elevation of the connector with the parts assembled, and

Fig. 2 is an enlarged detail view showing the parts partially separated.

Referring to the drawings, the improved connector comprises a nipple or cap 10 designed to be mounted on a grease cup or to form a portion thereof, and a nozzle 11 adapted to be detachably secured thereto. The nipple 10 is preferably provided with a valve 12, shown herein as a ball valve and forced yieldingly outward against the reduced end of the nipple opening by a spring 13. The inner end of the spring engages a ring 14, fixed within the nipple. The nipple 10 is also provided with a circumferential groove 15, as clearly shown in Fig. 2.

The second member or nozzle 11 is commonly connected by a flexible tube 16 to a grease gun or other lubricant container, (not shown). The nozzle 11 comprises a head 17 which may be soldered or otherwise secured to the tube 16 and a sleeve 18 threaded to the head 17, and forming an extension thereof. The sleeve 18 is provided with two or more radial recesses 19, adapted to receive locking balls 20. A second sleeve 21 is slidable outside of the sleeve 18 and is yieldingly held in the position shown in Fig. 1 by a spring 22 bearing against a shoulder 23 on the member 18 and forcing the end of the sleeve 21 against a collar 24 fixed on the member 18. When in this position, the sleeve 21 locks the balls 20 as shown in Fig. 1 and prevents separation of the nipple 10 and the nozzle 11.

When the parts are to be either separated or connected, the sleeve 21 is moved manually against the pressure of the spring 22 to the position shown in Fig. 2, permitting the balls 20 to move radially outward, releasing the nipple.

A plunger 25 is slidable axially in bearings in the nozzle members 17 and 18. A flange 26 on the plunger is normally seated against a shoulder 27 within the member 18 and is yieldingly held in this position by a spring 28 positioned between the flange 26 and the head 17. A leather washer 29 and a metal washer 29ª are preferably interposed between the flange 26 and the spring 28. The washer 29 may have the cross section shown in Fig. 1 and the adjacent face of the flange 26 may be conical, as also indicated in Fig. 1, this shape tending to force the washer 28 outwardly against the sleeve 18 to form a tight packing for the plunger which fits somewhat loosely in its bearings.

The conical outer end of the plunger 25 is adapted to force the ball valve 12 from its seat and also to fit closely in the opening in the end of the nipple 10. An axial passage 31 in the plunger 25 connects at one end with transverse openings 32 in the plunger, thus providing a path for the grease when the device is in use. When the parts are separated, however, the spring 28 forces the plunger against the shoulder 27 and moves the openings 32 into the bearing portion of the head 17, thus closing the openings and preventing escape of grease when the nozzle is disconnected from the grease cup.

From this description, it will appear that

I have provided a simple means of connecting a grease gun or other lubricator to a grease cup or similar device in such a way that the parts are firmly connected and will retain their position against relatively heavy pressure exerted through the tube 16. The washer 29 prevents escape of grease from the nozzle except through the axial passage 31. Furthermore, the passage 31 is closed at its inner end as soon as the nozzle is disconnected from the nipple.

Having thus described my invention it will be evident that changes and modifications may be made therein by those skilled in the art, within the spirit and scope of my invention as set forth in the claims and I do not wish to be otherwise limited to the details herein disclosed but what I claim is:—

1. A connector for lubricating apparatus having, in combination, a nipple with a recessed outer surface, a nozzle having radially movable locking elements co-acting with said recessed nipple, an outer locking sleeve covering said elements in all positions, said sleeve being slidable on said nozzle and having a recess receiving portions of said locking elements when said sleeve is removed from locking position, and a spring effective to hold said sleeve yieldingly in locking position.

2. A connector for lubricating apparatus having, in combination, a nipple having a recessed outer surface, a nozzle having radially movable locking elements co-acting with said recessed nipple and manual releasing means normally holding said elements in locking position, said nozzle having a spring pressed plunger with an axially extending passage therethrough for the lubricant and having a conical outer end yieldingly engaging the edge of the axial opening in the nipple and forming a tight connection therewith.

In testimony whereof, I have hereunto affixed my signature.

RAYNALDO P. JACQUES.

Witness:
H. P. Sutton.

And afterwards, to wit, on the 15th day of September, 1937, the following further proceedings were had and entered of record:

Wednesday, September 15, 1937.

Before:

Hon. Evan A. Evans, Circuit Judge.
Hon. William M. Sparks, Circuit Judge.
Hon. J. Earl Major, Circuit Judge.

Lincoln Engineering Company of Illinois,
6103 *vs.*
Stewart-Warner Corporation.

Appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division.

It is ordered by the Court that the petition for rehearing in this cause be and the same is hereby denied.

And on the same day, to wit, the 15th day of September, 1937, there was filed in the office of the Clerk of this Court a motion for stay of mandate, which said motion is in the words and figures following:

UNITED STATES CIRCUIT COURT OF APPEALS,

For the Seventh Circuit.

Lincoln Engineering Co. of Illinois,
Defendant-Appellant,
vs.
Stewart-Warner Corporation,
Plaintiff-Appellee.

Appeal No. 6103.

MOTION FOR STAY OF MANDATE.

To the Honorable Appeal Judges of the United States Circuit Court of Appeals for the Seventh Circuit:

Now comes defendant-appellant, the Lincoln Engineering Co. of Illinois, and respectfully moves this Honorable Court to stay the mandate of this Court for a period of forty-five (45) days, to afford defendant-appellant an opportunity to file a petition in the Supreme Court of the United States for

writ of certiorari, and further to stay the mandate of this Court, upon the filing of such petition for writ of certiorari, until such petition for writ of certiorari is acted upon by the Supreme Court of the United States.

In support of the above motion, defendant-appellant respectfully submits that it is now under an injunction with respect to the subject matter here in controversy (to wit, the sale of grease-cups or so-called "nipples" or "fittings"), and therefore the stay of the mandate cannot prejudice plaintiff-appellee, as the injunction will continue in force during such stay.

In further support of the above motion, defendant-appellant further respectfully submits that the amount in controversy in this suit is very small, if not indeed negligible.

The stipulated testimony of John R. LeVally on September 12th, 1936, on motion for supersedeas in the lower court, was to the effect that the sales of the enjoined devices by defendant averaged less than $100.00 per month for six months. Plaintiff's counsel admitted, at that time, that sales of the enjoined devices by the defendant are "not a very large matter to the plaintiff".

Defendant-appellant will file a petition in the Supreme Court of the United States for writ of certiorari, just as quickly as due order of business permits and expects to be able to do so within forty-five days.

Wherefore, defendant-appellant prays that the mandate of this Court may be stayed for a period of forty-five (45) days and that it may further be stayed upon the filing of defendant-appellant's petition in the Supreme Court of the United States for writ of certiorari, until such writ of certiorari is acted upon by the Supreme Court of the United States.

Respectfully submitted,

Leonard L. Kalish,
Counsel for defendant-appellant.

Endorsed: Filed Sep. 15, 1937: Frederick G. Campbell, Clerk.

And afterwards, to wit, on the 22nd day of September, 1937, the following further proceedings were had and entered of record:

Wednesday, September 22, 1937.

Before:

Hon. William M. Sparks, Circuit Judge.

Lincoln Engineering Company of Illinois,
6103 *vs.*
Stewart-Warner Corporation.

Appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division.

Now this day comes counsel for appellant and presents a motion for stay of the mandate of this Court pending a petition to the Supreme Court of the United States for a writ of certiorari.

On consideration whereof, it is now here ordered that the mandate in this cause be and the same is hereby stayed until the further order of this Court.

It is further ordered that counsel for appellant proceed with diligence and promptly file petition for a writ of certiorari in the Supreme Court of the United States, and forthwith file in this Court proof of the filing of said petition in said Court.

UNITED STATES CIRCUIT COURT OF APPEALS,

For the Seventh Circuit.

I, Frederick G. Campbell, Clerk of the United States Circuit Court of Appeals for the Seventh Circuit, do hereby certify that the foregoing printed pages, numbered from 623 to 721, inclusive, contain a true copy of the proceedings had and papers filed, excepting motions, stipulations and orders extending time to file briefs, briefs of counsel, and answer to petition for rehearing, in the case of

Lincoln Engineering Company of Illinois,
Appellant,

vs.

Stewart-Warner Corporation,
Appellee,

No. 6103, October Term, 1936, as the same remains upon the files and records of the United States Circuit Court of Appeals for the Seventh Circuit.

In Testimony Whereof I hereunto subscribe my name and affix the seal of said United States Circuit Court of Appeals for the Seventh Circuit, at the City of Chicago, this 30th day of September, A. D. 1937.

(Seal)

Frederick G. Campbell,
Clerk of the United States Circuit Court of Appeals for the Seventh Circuit.

SUPREME COURT OF THE UNITED STATES

ORDER ALLOWING CERTIORARI—Filed January 3, 1938

The petition herein for a writ of certiorari to the United States Circuit Court of Appeals for the Seventh Circuit is granted. And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

The Chief Justice took no part in the consideration or decision of this application.